Excavating Engineer

founded 1905

SEPTEMBER
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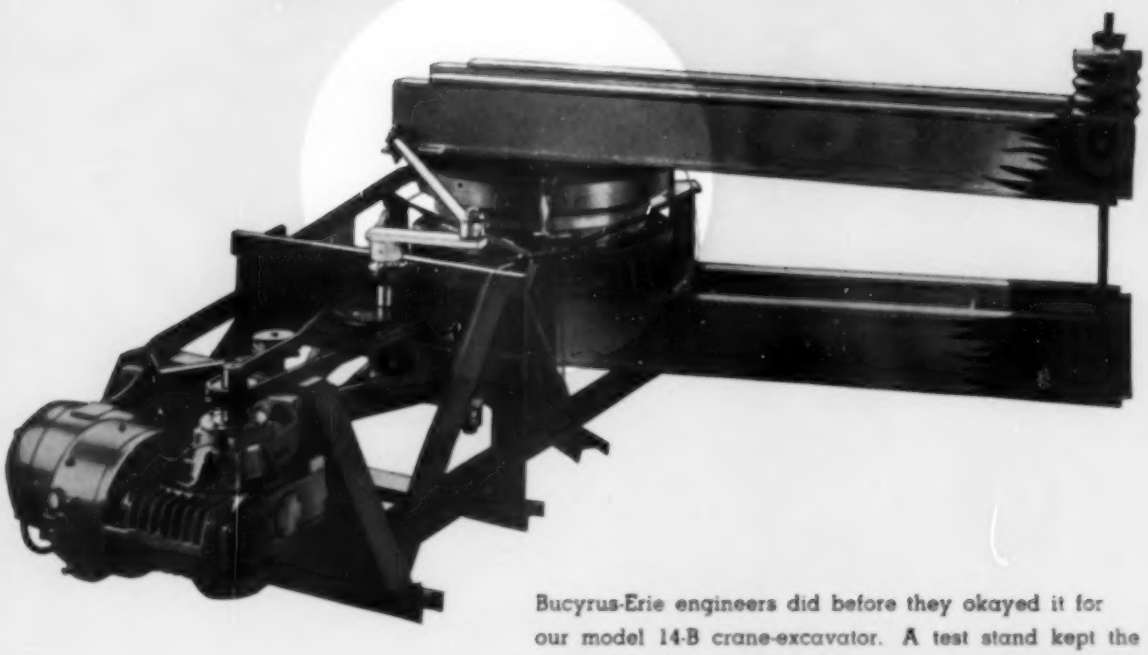
Intersecting utility lines and ground water complicate Phoenix (Ariz.) water line job of N. S. Shumway Construction Co. A story begins on page 4.

ever try to make a ball bearing swing circle say "uncle"?



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Volume 54

No. 9

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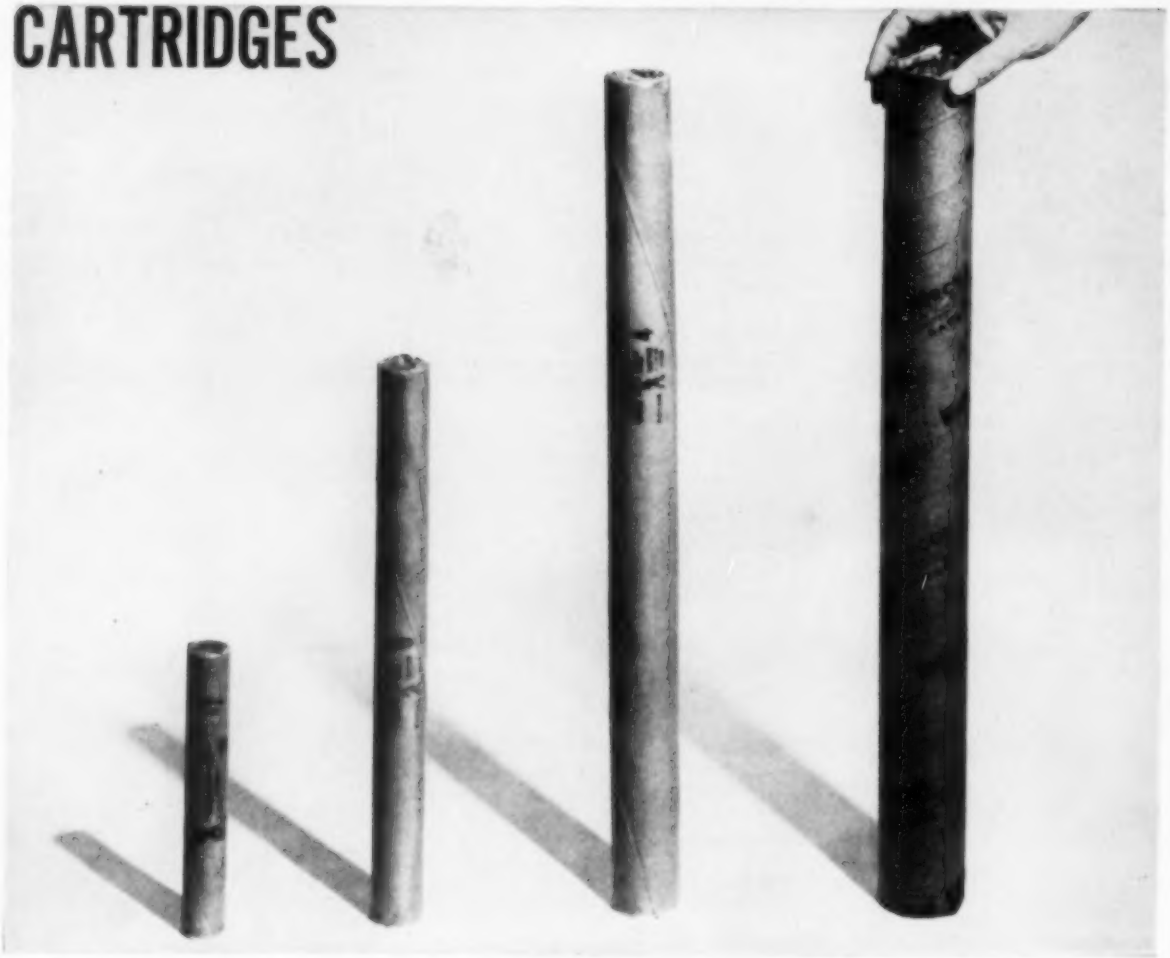

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Water Lifelines for Booming Phoenix

Contractor's equipment spreads battle way through utilities, tough ground and residential areas to lay new mains.

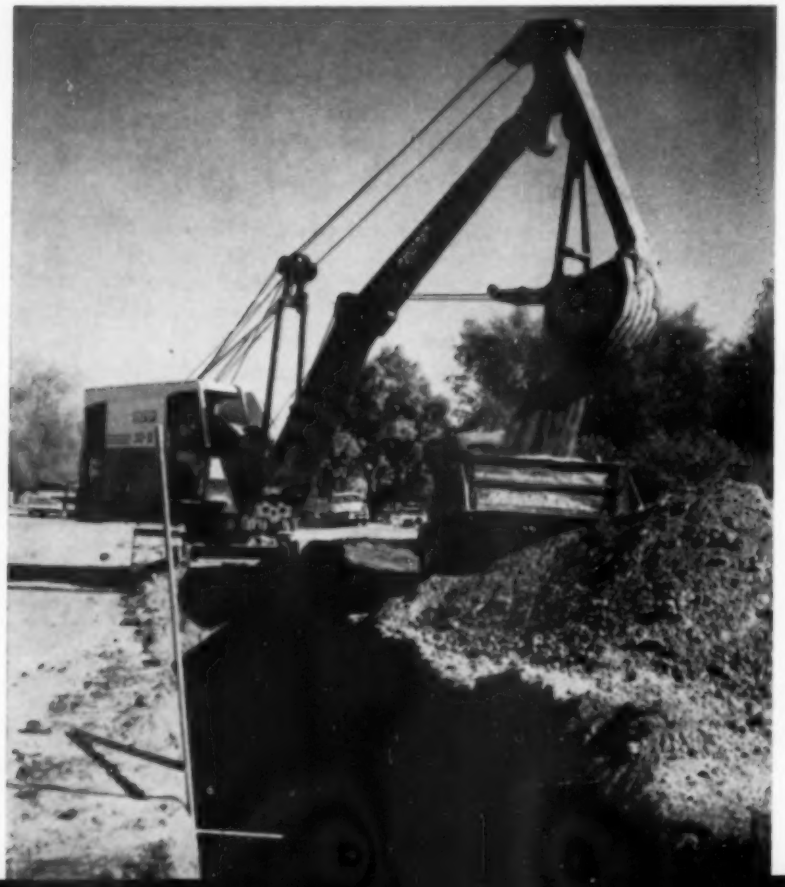
by Ray Day

Here is operator's view, looking out of hoe's cab. Case Terratrac finegrades the ditch while pipelayers move up behind.

SCATTERED these days across the city of Phoenix, Ariz., are many open trenches, with the rights-of-way around them covered with new pipelines. To the north of City Center and also to the east, heavy equipment is working from early in the morning to sunset on what has always been the West's greatest engineering problem connected with its sociology: water.

At two major locations, Phoenix Contractor N. S. Shumway Construction Co., has projects under way for the city water department. In the east end near 48th and Thomas Road, there's a whopping big 10½-mile job of exceptionally heavy line. Most of it is 54-in. pipe in 32-ft. joints. North of the main city center in the vicinity of 18th Street and Bethany Hospital Road, another 4 miles of water line is being installed. It, too, is a big job—$1,114,000 worth—and it calls for 2 miles of 54-in. diameter and 2 miles of 60-in. diameter pipe. Both projects exemplify many of the difficulties of bringing large supplies of water to a city whose growth is mushrooming as rapidly as that of Phoenix.

One of Shumway's newest machines is this 1-yd. 30-B hoe which was brought in for the heavier trench excavation. Material is hauled to a stockpile for reuse later.



There have been conservative estimates made that the population of Phoenix will equal that of San Francisco by 1980. It seems headed in that direction from all indications.

Phoenix residents apparently believe so, too, because they recently approved a $70 million bond issue which is being used in part to finance much of this new work. The lines which Shumway is building will only transmit water already available from existing supplies.

Of all the problems on the northernmost project, possibly the greatest has been trench excavation. Trench depths here will average 12 feet. Some excavations must go down 16 feet. The material consists of heavy bedded clay, clay and gravels mixed, caliche beds and desert sand. With the exception of the latter, it's all tough digging.

Ditch foreman uses a Gradeliner to check bottom levels in pipeline trench after workmen finish with hand shovels. Aluminum instrument is easy to move around.

At the extreme east end of the project where the new water line winds around the base of a jutting mountain peak, the excavation is so tough that a hoe dipper has been equipped with special ripping shanks and teeth, so that the material can be loosened before the digging pass is made.

The bulk of trench excavation is being handled by a Bucyrus-Erie 30-B hoe carrying a Bucyrus-Erie dipper. This machine, which is somewhat larger than smaller hoes which contractors have used in the past on such work, will easily reach down into the deepest parts of trench excavation. Powered by a Caterpillar D318 diesel engine, this machine has consistently turned in good excavating performance, according to project officials and to Jim Monterieri, operator. There have been many days when the machine excavated trench 8 feet wide and 12 feet deep in hard bedded materials, and it still accounted for 350 feet of advance in an 8-hour shift.

Almost half the excavated material being dug by the 30-B is being loaded into a fleet of 7-yd. dump trucks of varying makes, to be hauled to a stockpile area fairly close to the digging site. The fact that hoe excavated material must be truck loaded, however, imposes more than average punishment on the hoisting drum and brake on this machine.

After a short period of such work, one thing was fairly evident—brake linings on this drum tended to take on a hardened glaze, rendering them practically useless long before their theoretical service life had been reached.

Company mechanics and machine operators soon solved that problem by installing a small blower and an electric fan, directed to shoot a stream of air against the drum. Cost of this preventive maintenance installation

Short Cuts to Efficiency

PROBLEM: How do you get a pipeline trench through a canal area where the groundwater level is 8½ feet below ground surface, and where the pipe must go down 16 feet?

ANSWER: Have a well driller put down a 50-ft. deep well and install an 8-in. turbine electric pump. It pulled the water down in a cone around the entire area.

PROBLEM: How do you keep brake bands from hardening and glazing long before their useful life is exhausted?

ANSWER: Mount a small auxiliary blower or electric fan so that it'll move cool air over the hoe's hoist drums. It did the trick here in 100° heat. Cost of installation was negligible, with excellent results.

PROBLEM: How do you save expense and get a better pipeline-laying job when specifications call for sand as a cushion material?

ANSWER: Get the engineers to okay a change to minus 1-in. aggregate base-course material. It had to be used under street surfacing on this job anyway; reduced handling to one material; shaved costs appreciably.

was negligible, but it's had excellent results. The brake linings now last the way they're supposed to, and there's been no further trouble on that score.

Material loaded into trucks by the 30-B is being dumped in a stockpile area, partly for waste and partly for re-use later on. It is expected that about 1,800 feet at the east end will be in rock. Plans here are to over-excavate and backfill to grade line with good material, as a protection to the pipe. With all the good material available, it will be easy to pick it up and bring it back for use in that section. A Michigan 75-A tractor shovel, which is on the job for miscellaneous loading, can be used to excellent advantage here.

Assisting in the trench excavation job is a Koehring 304 hoe. This machine has been used generally in areas where there is less truck loading to be done, although it has been placed in some of the very hardest material. As a matter of fact, its dipper also is being equipped with special ripper shanks and teeth to break up the harder formations.

P&H pipe placing crane is kept busy handling 16-ft. joints of 60-in. pipe.

Measured by any standards, the job of hauling in, unloading, handling and laying the 54 and 60-in. pipeline joints is a heavy one. The 16-ft. joints of 60-in. pipe, which were manufactured by American Pipe & Construction Co., weigh 12½ tons each. Since they have to be handled by machines which sometimes ride on the loose dirt of spoil bank, it's a tricky lift.

To make as safe and solid a spot as possible, what dirt is left behind the excavating machines is knocked down flat on top by an International TD-9 dozer. This is an old machine, but is still more than adequate for service such as this. After it has finished leveling the spoil bank, a Caterpillar No. 12 motor grader also is available to dress the top down to haul road smoothness, all of which helps greatly to get trucks and pipe into the job.

Unload Into Ditch

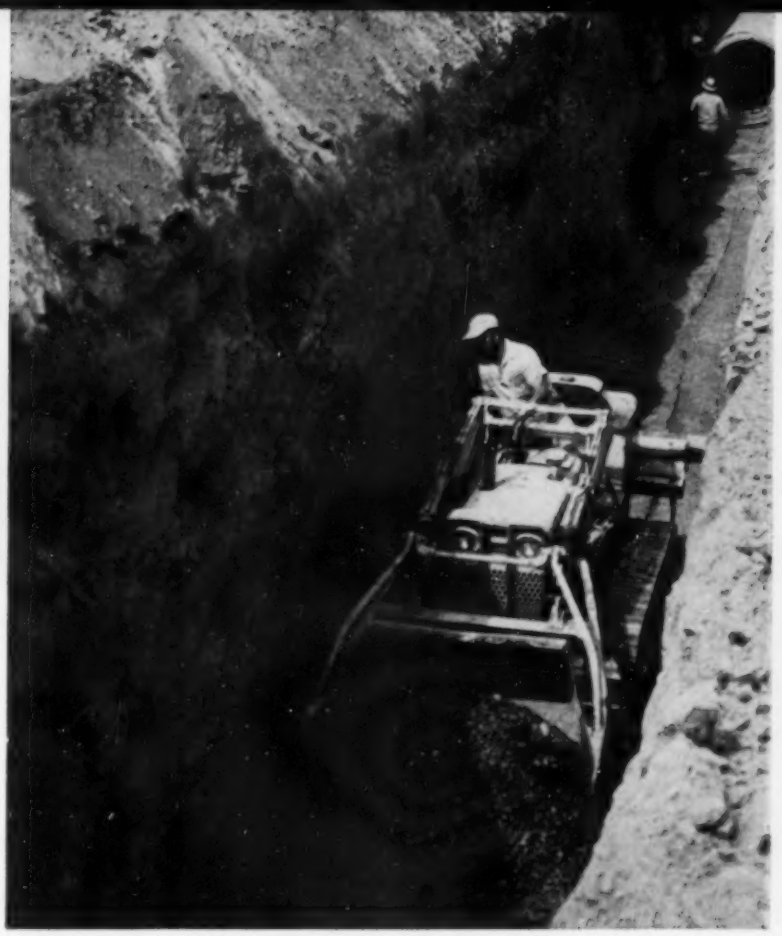
Peterbilt and Autocar truck-tractors are being used with trailers to haul two joints of pipe at a time. The pipe sections are unloaded at the job, and sometimes if delivery is unusually prompt, sections can be taken directly off the truckbeds and unloaded into the ditch without a period of secondary storage.

For a considerable length of time a rented Koehring model 405 crawler-mounted machine was available for handling the heavy pipe sections, and it did this work adequately. When it had to be pulled off the job, however, Shumway's management rented a truck-mounted P&H crane from Crail Crane & Rigging, Inc. After experimenting with this machine for a few days in soft material, the company decided to go back to the rental of a heavier crawler-mounted rig, and negotiations were begun for rental of a Northwest 80-D. Equipped as a crane, it could handle the heaviest pipe joints, even with a 90° swing over the ditch, without the addition of extra counterweights.

One of the important factors which governs speed on this job is the manner in which the trench is handled just before the pipe is placed. It is obviously desirable to mechanize finegrading and other supporting operations connected with pipe placement just as much as possible to cut down on the man-hours of labor on Shumway's payroll. However, the selection of equipment small enough to work in an 8-ft. wide ditch and still big enough to do a great deal of work doesn't exactly give a tremendous market to choose from.

Shumway's management solved that problem by bringing in a small Case Terratrac 600 tractor which carries a bulldozer blade on its front end, and a pushing plate on the rear. When a pipe section is lowered into position by the crane working above, the little Case tractor has enough power in reverse to push the joints home on their rubber-seated gasket. Then, between the installation of each pipe section, it moves forward down the ditch line, blading and finegrading the cushion material which is backfilled just underneath the grade line. Theres' not enough room in the ditch for it to turn around.

Heads-up planning of this cushion material resulted in a very satisfactory



(Above) Michigan loader strings cushion material down the ditch line. (Right) Case Terratrac 600 works well in narrow trench. It is used for finegrading the cushion and for pushing the pipe sections together.

substitution which was okayed by Yost & Gardner, consulting design engineers of Phoenix. Original specifications called for the use of a sand blanket as cushion material. However, in another part of the plans and specifications, a standard aggregate basecourse material consisting of minus 1-in. crushed rock, well graded, was called for just under pavement replacement. Shumway's management considered all the angles of buying and handling two sizes of material instead of one, and obtained permission to substitute aggregate basecourse rock at the bottom of the trench.

Actually, the substitution has worked considerably better than the material originally specified, say not only contractor representatives but the engineers, as well. There is something about the crushed rock which gives much greater bedding strength, so that the beautiful grade lines can be reproduced faithfully as the pipe sections are laid. Surveyors originally installed precise level hubs every 50 feet at the top of the ditch. These levels are transferred directly to the trench bottom as the finegrade is made by means of a lightweight Gradeliner checking device. After the Terratrac tractor has leveled material dumped in from above by the Michigan 75-A tractor shovel, a small three-man force of workmen complete the finegrading job with their shovels. A small Essick mixer working from above is used to make a fine cement slurry, which is then used to fill up the pipe joint over the gasket.

Specifications call for backfill dirt to be placed in two lifts, the first lift reaching to a point above the pipeline. This is then followed by water flooding, which consolidates the material around the pipe without disturbing the joints or its pre-set grade.

Backfill Procedure

Backfilling is done chiefly by a Schield-Bantam clam with a backfiller blade, and with the same machine working with an Owen clam bucket occasionally to equalize the loading in the ditch. Some backfilling also has been done by the Michigan 75-A tractor shovel. It has ample reach to get out over the ditch and do a more even job of backfill loading. Since most of the pipeline passes through areas well protected by fire hydrants, ample flooding water is easily available. After an adequate settling out period, the trench backfill is to be topped off by aggregate base-course material, and then the bituminous pavements will be replaced with the same general type of material which was removed in the beginning stages.

Because the line passes through highly settled residential areas where children could easily fall into a ditch and get hurt, the company maintains a traveling patrol from the time the shift ends until most children go to bed about 10 p.m. Also because of this same reason, every effort is being made to keep the progress of the ditch line closed up just as much as possible. At the time the notes for this article were made, the ditch was strung out for a distance of about 1,000 feet from the point where original excavation was being made to the point where backfill had been replaced. In many instances, however, it has been closed up tighter than that. And this is especially true over week ends.

This complex section was expected to be finished by early summer, thus bringing a whole new water supply to the northwestern part of Phoenix. In preparation for transmitting this new increased water supply, the city of Phoenix recently doubled the capacity of the water-treatment plant which serves this area. Completion of the job will assure for quite a few years

TD-9 closes up ditch as fast as possible in busy residential area. N. S. Shumway maintained traveling patrol to protect children.

in the future a steady supply of clear, sparkling, pure water for a portion of the city which has never quite had enough of that precious material.

For sheer toughness, for heavy handling of heavy material, and for the toughest battle of all in everything from solid rock to groundwater, nothing beats the 10½-mile job of Shumway's other spread on the east side of Phoenix. Here, intersecting utilities are more numerous, the presence of groundwater near the surface is an ironical twist to the reason the line is being laid in the first place, and even the presence of irrigation canals is a problem.

Encounter Rock

This section started off nearly 2,000 feet of the toughest kind of rock excavation. There was no way to battle through or rip this portion of the trench, so Shumway's drilling equipment was brought in: Ingersoll-Rand compressors, two Ingersoll-Rand wagon drills, and several Jackhammers for close-in drilling and shooting. It was a job for tungsten-carbide rock bits and good drillers.

Part of the ditch was drilled down both slope lines; part required drilling on both slope lines and also in the center. The drill holes, which were carried about 18 inches below grade, were then loaded with gelatin-type high explosives, and the shots were equipped with delays to minimize shock and vibration, as well as to increase the shattering effect of the shot. After the ditch was broken up in that manner, it was an easy job for the big hoe which has done practically all the ditch excavation on this project. The machine is a Bucyrus-Erie 51-B, equipped with an outsize 4-yd. dipper. It really makes good progress when it gets to work. Good runs up to 600 feet per day were made by this big machine, even in trenches running 15 feet deep.

This spread has been one for spectacular construction accomplishments. For instance, there was a half-mile spot centered around an irrigation canal crossing, where groundwater stood within 8½ feet of ground surface, but where the trench levels called for 16 feet of excavation. Wellpoints were out of the question because of their cost, so some other more economical method of unwatering the trench over a vast area had to be developed.

Shumway's management came up with a good answer in the form of a 50-ft. water well which was drilled just along the ditch line at the canal. The well was drilled 50 feet deep, 45 feet below the level of the water at canal bottom. A Johnson deep-well turbine pump, driven by an electric motor, was then installed in the gravel-packed well and put to work on a 24-hour-a-day, 7-day-a-week basis. It did an excellent job of pulling the water down over a wide area in a vast saucer-shaped cone, so that when machines made the tricky crossing with large-diameter pipeline, they were able to do it under fairly dry conditions.

It was necessary to use a small Schield-Bantam clam to muck out the last two feet of mud and water behind the 51-B, and to put in a supplementary Gorman-Rupp pump with its intake suction in special sumps near that point. Once that was done, a Michigan 175-A tractor shovel quickly brought in cushion material to build the trench up to exact grade line, after which the pipe sections were lowered into place by a short boom Bucyrus-Erie 37-B crane.

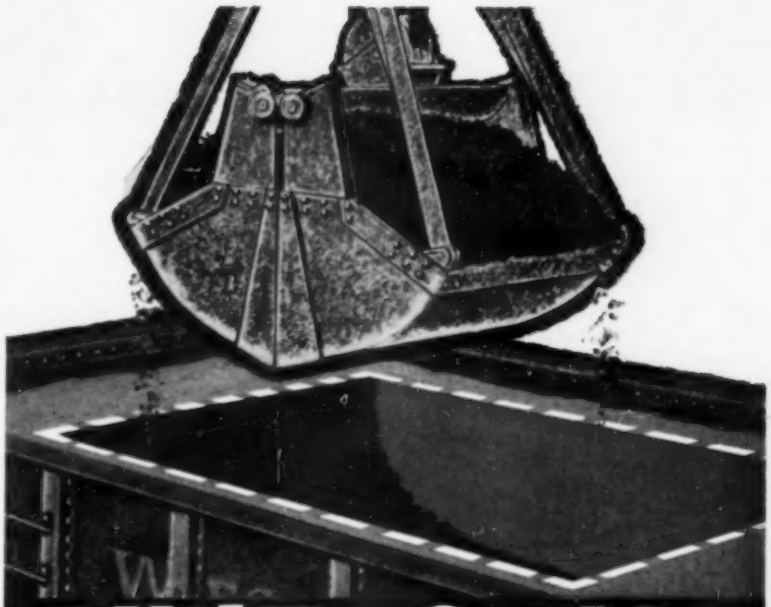
Another unusual stunt on this spread was the handling of a huge

concrete pipe tee whose weight was close to 30 tons. It was necessary to pick up this ponderous section and carry it about 100 feet to the point of placement. Handling the lift with one machine was out of the question, so a P&H crane also was brought in on a rental basis. Working with the Bucyrus-Erie 37-B, it hooked onto the piece. The two machines, synchronizing beautifully, shuffled over to the place where the piece had to be laid. It was handled without a mishap.

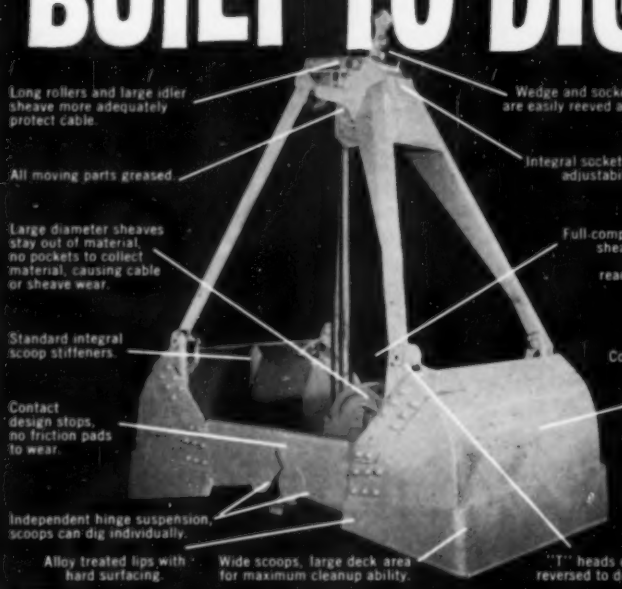
Supporting operations on this spread are very similar to those previously described, except that since the pipe is bigger they are on a larger scale. The pipe joints on this spread are 32 feet long instead of 16, so the weights are about twice as heavy. The sturdy, stable, venerable 37-B, however, has given an excellent account of itself in setting this heavy type of pipe.

Completion of this section, too, will open up a whole new area of domestic water for the eastern environs of Phoenix. By late summer, all work on the two spreads is expected to be finished, contributing immeasurably to the water needs of one of the West's most rapidly expanding communities.

Equipped with an outsize 4-yd. dipper, 51-B hoe made runs up to 600 feet per day, digging trenches up to 15 feet.



BUILT TO DIG!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CORAL RIDGE—

24-Carat Gold Coast

(Above) A haul road, which will become a street in the new subdivision, is patrolled by a Cat No. 12 grader. (Right) This is how the same area looked in 1954 before it was filled.

Earlier this year, $6½ million worth of lots were sold within 14 minutes time during a spectacular sale staged by former Detroit (Mich.) automobile super-saleman Jim Hunt.

APPEARING on the office walls of Coral Ridge Properties, Inc., in booming Fort Lauderdale is this slogan:

"The Best Investment on Earth Is EARTH!"

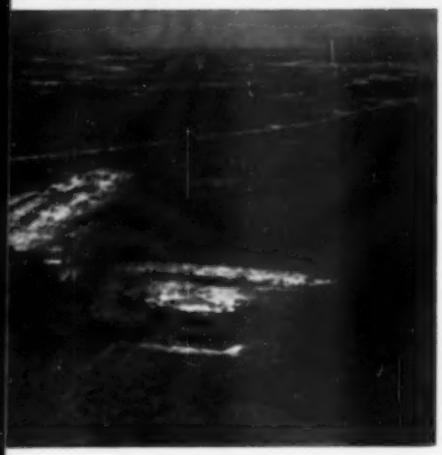
The motto has paid off handsomely for the Florida firm, one of the biggest and oldest land developing companies in the southeastern United States.

Best example of 14 years of successful developing and merchandising is the 4,000-acre tract of land purchased in 1953 for about $20 million. Developed into 15 subdivisions, it is now valued in excess of $175 million and has grossed its developers more than $10 million annually.

Currently being developed is a 187-acre section of that property. Formerly nothing more than mangrove swamps, it is being transformed into valuable waterfront property—a project involving moving nearly one million yards of earth and sand with the aid of dredges, tractors and scrapers owned by affiliates of Coral Ridge Properties.

Spearheaded by James S. Hunt, Sr., and Stephen Calder, Coral Ridge covers the operations of some 40 separate corporations including earthmoving, dredging, construction of homes and hotels, shopping centers, mortgage and insurance companies, etc. Generally speaking, the dredging and land improvement operations are under the direction of James Hunt, Jr., and the mortgage financing and

Framed by a scraper and dozer are principals of the earthmoving firm (left to right) James Hunt, Jr., president; Dave Lane, general manager; and George Beltz, general superintendent.



insurance business under the supervision of Jack P. Hunt.

The land development currently under construction is Coral Ridge Country Club #3, a 541-lot subdivision where lot prices alone range from $7,500 to $25,500. Last February, in one of the pre-development Florida land sales which super-salesman Jim Hunt helped make famous, $6½ million worth of these lots were sold within 14 minutes. The lots were offered to 4,000 eager buyers, most of them real estate brokers, at the pre-development discount of 25% (30% for immediate builders). The discount applied only during 14 minutes of the sale.

On another occasion, Hunt (who came to Florida in 1946 to retire) sold $2 million worth of lots in 9½ minutes! Credited with devising the NADA "Blue Book," the Bible of used car dealers, Hunt formerly operated the biggest Chevrolet agency in Detroit.

The new subdivision, scalloped by nine "finger islands" along the famed Intracoastal Waterway, is the final section surrounding an 18-hole golf course designed and operated by golf course architect Robert Trent Jones. Only a few years ago the entire area consisted of palmetto and mangrove swamps. Construction of the "finger islands" is a perfect solution for Florida developers. Not only does it drain the swampland and provide much-needed fill, but it converts wasteland into golden nuggets of waterfront property.

The transformation is being carried out by sand dredges and heavy earthmoving equipment owned by the junior Jim Hunt's Earthmoving and Excavation Co., an affiliate of Coral Ridge. Caterpillar DW21-470 tractor-scrapers are hauling the white, sugar sand fill as fast as two Beaver dredges pump it up from the channel.

Dredge Sand

The dredges, one with an 8-in. pump powered by a Cat D337 diesel engine, the other, a 10-in. pump using twin GM 6-71's, bite out the canals at right angles to the Intracoastal Waterway. Throwing up a dike around a proposed "finger island," canals are cut and the area inside the dike filled with sand. A small opening in the dike permits dredged water to escape. Measuring 90 to 200 feet wide, 1,200 to 1,400 feet long and 14 to 16 feet deep, the canals are constructed so that any boat navigating the Intracoastal can enter them. The islands themselves are an average of 200 feet wide with seawalls of precast concrete slabs, installation of which is the responsibility of the property owners.

In a normal 10-hour workshift, the dredges lumber forward about 100 feet, spewing fill through a pipeline which ranges from 500 to 6,300 feet long. Dredging in south Florida is relatively easy in sand, very difficult in rock. About 20% of the time the dredge encounters tough coral rock which must be blasted loose. The dredges, operated under the supervision of Capt. James Murray, are not self-propelled. Moved to new areas by tugboats, the dredges "walk" and pivot by raising and lowering two cylindrical spuds at the rear. Canal banks are all cut down to a minimum even depth of 14 feet.

When the islands have been brought to the desired elevation—approximately 7 feet—by an estimated half million yards of fill, excess fill from the canals is used to bring inland lots to grade. Pushloaded by a Cat D8 tractor, three DW21's pack in 19 to 20 yards of wet 2,700-lb. sand in an average of 55 seconds. The scrapers move approximately 380 pay yards an hour over a 3,600-ft. haul, part of it along a paved road edging the golf course, where the units hit speeds of 27 mph, according to General Superintendent George Beltz, who formerly ramrodded spreads for the Perini Corp.

To reduce waiting time, step-loading is used whereby the D8, after loading one scraper, steps over to the next. "Wherever possible, we make the pans chase the D8, instead of the D8 chasing the pans," Beltz said. Three D6's are used to level material stockpiled on the islands by the dredges and to grade fill material delivered by the DW21's. In the early stages of development, the D6's were also used for clearing and grubbing. A rented No. 12 motor grader maintains unpaved haul roads, blades fill

This completed section of the Coral Ridge development shows typical finger islands that point out at right angles to the Intracoastal Waterway (bottom of photo).

Canals are cut by 8 and 10-in. diameter Beaver dredges. Excavation provides much-needed fill, helps drain swampland and creates valuable waterfront property.

on lots, and grades base course material on the six miles of new road constructed in the subdivision.

Equipment downtime is kept to a minimum by making each tractor and scraper operator responsible for greasing and fueling his own machine. He is assisted by a grease man. This is done at the end of their 9½-hour shift, with the men receiving a half-hour's overtime pay each day for servicing their machines. Reports of machine operating deficiency are turned in to Chief Mechanic Marshall Brown.

"We like to think we have a good maintenance system," commented Dave Lane, general manager of the earthmoving firm. Lane, who formerly worked for the Nello L. Teer Co., of Winston-Salem, N. C., said that by making each operator responsible for his own machine, better care is taken of them. "We feel it's well worth the overtime pay," he said.

Although the city of Fort Lauderdale will put in the water system on the new subdivision, the earthmoving firm itself will install sewer lines. Using a Marion 43-M dragline with 1½-yd. bucket to dig the trenches, the firm will string approximately 14,000 feet of 8 and 12-in. Tylox vitrified clay pipe.

To date Coral Ridge Properties has reclaimed over 900 acres of swamps and built more than 4,500 homes housing over 11,000 people, making the Coral Ridge area half again larger than the entire city of Boca Raton to the north. The $25,000 to $75,000 price bracket for these homes have won for the area the title of the "24-Carat Gold Coast." It is a distinction which has helped Fort Lauderdale, a sleepy little hamlet of 2,000 in 1920, mushroom into a teeming metropolis of 85,000 in 1960.

A Cat DW21-470 tractor-scraper hauls material dug from a canal and transports it to low-lying inland lots for use as fill. Prices for lots on the 187-acre subdivision range from $7,500 to $25,500.

(Below) A D6 dozer, one of three on the job, grades fill delivered by the scrapers. The tractors also were used for clearing and grubbing.

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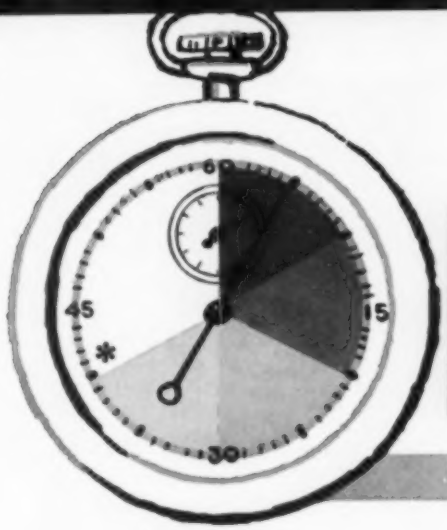

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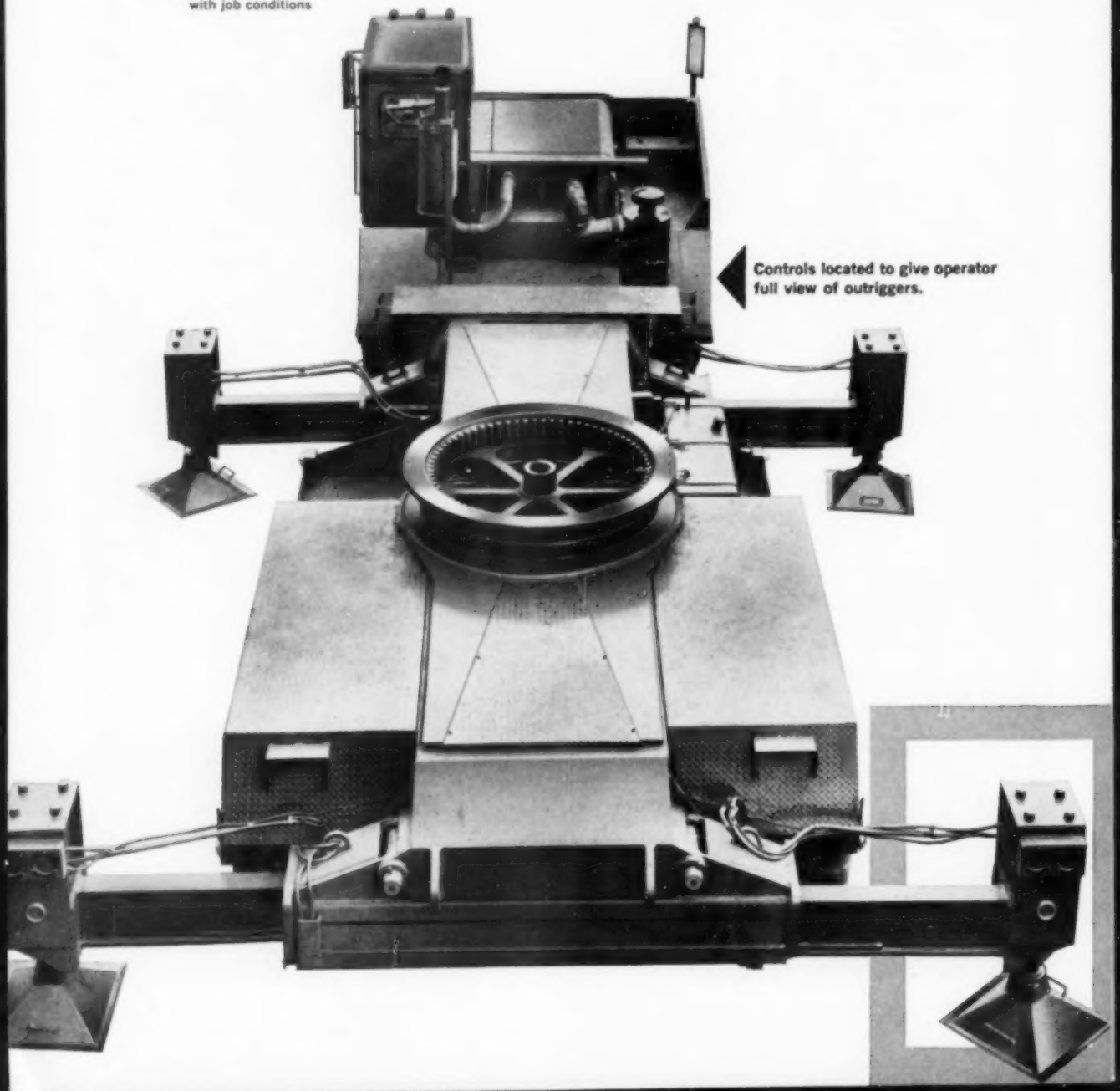

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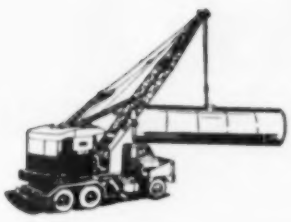

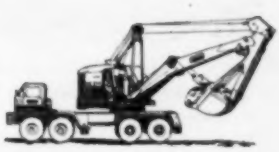

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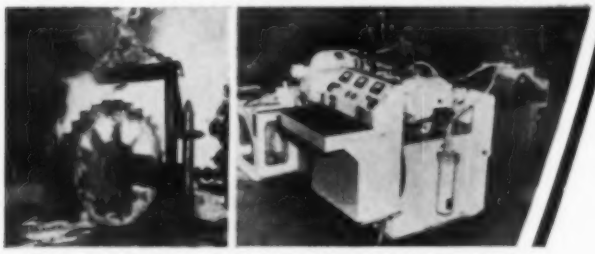

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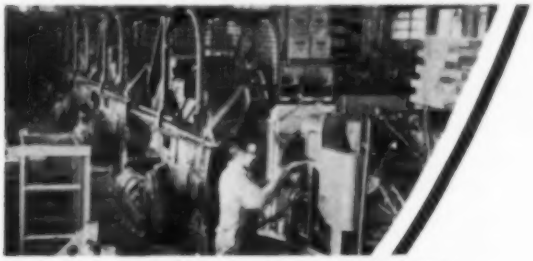

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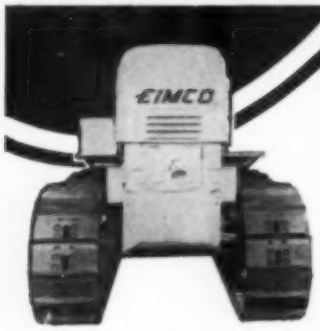

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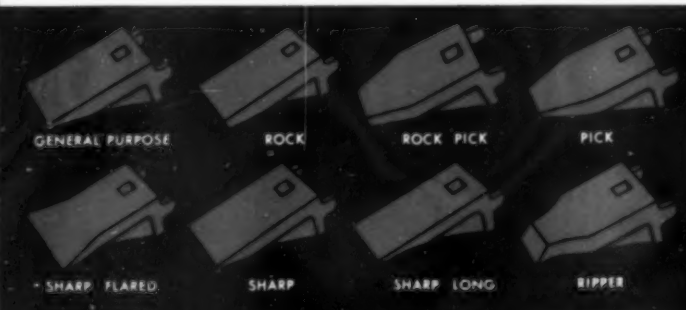

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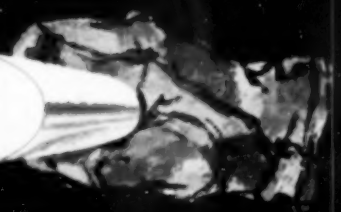

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Muck covers the Flaco section of the Belt Line from end to end. Prolonged good weather has simplified the removal task.

Million-dollars-a-mile grading . . .

Mobile's Belt-Line Highway

Skeptics scoffed at the idea of building a superhighway through "bottomless" Wragg swamp near Mobile, Ala. They reckoned without the skill of two contractors who took the job and treated it as a routine day's work.

IF you dodge around the barricades that seal off unfinished stretches of right-of-way, you can preview a bypass that soon may unsnarl the traffic tangle in downtown Mobile, Ala. You have to drive cautiously over the sandy rough grade, and ford running streams where culverts are still to come. But the wonder of this new route is not just being able to avoid as much as an hour of stop-and-go traffic. The marvel is being able to travel here at all.

For this new superhighway, destined to be the southernmost section of Interstate 65, has already made a name for itself among Gulf Coast construction men. They call it "the-million-a-mile miracle." The route cuts through swamp areas that once offered so little support, it wasn't safe to stamp your feet as you walked along. One muck-spattered worker wryly describes the terrain as "too loose to shovel and too thick to pump."

Traffic Hub

There were those who said this road couldn't be built at any cost. And others—including city and county officials—knew it had to be built. Years ago the Belt Line (as the bypass came to be called) cropped up in long-range plans to solve Mobile's traffic crisis. But the dreamers saw it as a two-lane road, about as big a construction problem as anyone cared to tackle at that time.

Mobile's traffic woes are partly man-made, partly an inheritance from the Mauville Indians who first settled this site on the west shore of Mobile Bay. The city lies on a flat plain, probably delta land of the Mobile River, which empties into the Gulf here. Sluggish bayous and streams lace the area. Off to the west of the thick urban sector, steep foothills rim the plain.

In its strategic spot at the head of

Alabama is dragline country. Machine at left swings its 3-yd. Hendrix bucket far out from tip of its 90-ft. long boom. Long cast avoids excess rehandling of muck.

Mobile Bay, the city became a tight traffic funnel. U. S. 90—"Main Street" of the Gulf Coast—crosses from east to west. Other federal highways connect the city to upstate places like Birmingham, Ala., and Jackson, Miss. Because of the wet terrain on the rim of the plain, all these roads aim straight into the city's busy "loop."

The idea behind the Belt Line was to intercept through traffic before it entered Mobile's downtown zone. Routed in a big arc along the base of the foothills, the bypass crossed all major highways.

It also crossed some of the wildest terrain ever faced by Alabama roadbuilders. Wragg swamp (local parents warned their youngsters to stay clear of this "bottomless" place) lay smack on the planned alignment. Almost every foot of the 6¾ miles presented some kind of problem—heavy traffic, high trees, or soggy muck.

Interstate Route

So it wasn't till federal authorities agreed to include the Belt Line in the interstate system that the project moved from the dream to the digging stage. At its southern end, the bypass (now a leg of Interstate 65) will connect with I-10, the planned coast-to-coast route from Florida to the west. North of Mobile, I-65 will provide non-stop travel to Montgomery, Birmingham and other points all the way to the Great Lakes.

In its final form, the bypass became a four-lane limited access highway with parallel service roads for most of its length (a right-of-way about 300 feet wide in all). The city tacked on a feature—under separate contract from the highway work—to increase the benefit of the project. A wide drainage canal, designed to connect into the existing runoff pattern, is being carved through Wragg swamp alongside the highway. The canal will protect the new road—and the low-lying western part of Mobile—from flash floods produced by concentrated rainfall in the foothills.

Cohron Construction Co. kicked off the project in February 1958. Their dozers moved into the southern part of the route to clear dense stands of maples, gums, beeches and oaks.

In November of the same year, Blount Brothers Construction Co. began the big dirtmoving task. Now, with just a fast glance at the contract figures you might think this shaped up as a neatly balanced job. About 2½ million yards of excavation, and the same amount of fill.

But the figures hide the facts. Excavation, yes—but mostly to remove muck and unsuitable material from the right-of-way. Then the fill goes right back in the same spot. So the job adds up to double digging—once

Where Belt Line Money Goes

Here is a breakdown of prime contracts on the initial phase* of Mobile's swamp-hopping Belt Line highway.

Contractor	Contract Amount	Contract Length
Blount Brothers Const. Co.	$2,840,372	3.221 miles (Exc. & grading)
Flaco Corp.	2,622,983	3.351 " (Exc. & grading)
Laidlaw Contracting Co.	858,459	0.258 " (Structures)
TOTAL	$6,321,814	6.830 miles

* Paving will be let as a separate contract.

(Center) In a borrow pit, an LS-98 loads sand into Mack tandem-axle dump. (Right) A 1-yd. dragline opens drainage ditches.

to pull out the muck, later to load borrow for clean backfill.

Blount Brothers, therefore, planned their spread in two sections. A dragline scooped out the muck. Then a fleet of scrapers hauled in the sand.

A big walking dragline sparkplugged the marshland digging. Wielding a 180-ft. boom, the rig handled much of the muck removal in one pass down the center of the strip. That's where the big boom proved its worth. The trick was to cast the material into a spoil area alongside the right-of-way.

Everything worked out just as planned. Using every inch of stick, plus all the swing his rig could deliver, the dragline operator dropped the muck neatly offside. Then dozers leveled the spoil piles to form a smooth berm.

When the cut reached solid bottom (at a depth that varied from a few inches to 15 feet in spots), the scrapers rolled in with sandy backfill. Blount Brothers opened a pit in a hilly area about ¼ mile from the right-of-way. With two Caterpillar D9 pushers to clip seconds off the loading cycle, the fleet of ten scrapers —Cat DW21's and Euclid S-18's— moved about 20,000 yards of borrow a week.

Included in the Blount Brothers contract is a big interchange where

Sand boils up fast in the bowl of an Allis-Chalmers TS-260 scraper as a Cat D9 pushes. Pans haul fill for a bridge ramp.

(Left) Doubling between pit clean-up work and loading haul trucks keeps busy this International TD-20 crawler, with Drott Skid-Shovel out front.

(Right) Water truck builds up the optimum moisture content of the sand. The 500-gallon tank is mounted on a GMC flatbed.

Two rollers compact the clayey sand fill. First pass by a sheepsfoot is followed by vibratory compactor. A Case utility tractor tows each of the rollers.

I-65 crosses US 90. The cloverleaf covers a 45-acre area.

At the time *Excavating Engineer* visited the Belt Line job, major activity had moved up the line to a 3.3-mile section held by Flaco Corp., of Whistler, Ala. Flaco won the contract against stiff competition. Six outfits bid on the stretch (Old Shell Road to Highway 45). Flaco's $2,622,983 tender took it.

Soil conditions here differed little from the Blount contract. Muck, in layers up to 5 feet thick, covered the right-of-way from end to end. Under it, a bed of stable sand.

Project Manager Ralph Compagno, architect of Flaco's master plan, gives due credit to his men and machines for steady progress of the job. (Work is just about on schedule despite a good deal of extra digging in deep muck pockets.) He also has a kind word for the weather this season. A prolonged dry spell lowered water levels in the marsh. This gave the dirtmovers a chance to move full steam ahead.

Even so, when you jockey your car along the rough access trail through the swamp, you'll find tire-deep water standing in spots. The rough road leads straight to the edge of the cut, where a Bucyrus-Erie 54-B dragline works beside a towering pile of musty smelling peat.

The operator takes time for a swig of water while he chats about his work day in this isolated wasteland.

"You'd be surprised at the gunk that comes up in the bucket," he says. "Everything from half-rotted tree stumps to old washing machines. But mostly it's this black, sticky muck that splashes when you drop it on the pile."

He kicks a clod of matted earth and grass that has stuck to the timber raft on which the dragline stands.

Handling the big logs that make up the raft is one of the tricks he has learned to do on his own—and fast. A cast-steel hook at the end of the drag cable serves as his extra hand. He snares the hook through the lifting loop of cable embedded in the timber. In one smooth motion, the operator swings the machine around and drops the log neatly in position behind.

The 54-B wields a 90-ft. stick—a length that gives boarding-house reach for top casting distance. The shovel-runner works his rig close-in to the face, to cut to full depth in one pass. The 2½-yd. Hendrix perforated bucket comes up heap-loaded with sticky muck each time. The operator casts the material wide and far, dropping it onto a loose stockpile. In places along the 300-ft. right-of-way he must rehandle the muck as many as four times to move it into designated spoil areas.

You can get a good discussion going among Mobile construction stiffs on what size dragline is best for wholesale muck removal. Compagno grants a giant machine has its points—in its place. On his job, the amount of muck and depth of the deposit gives the nod to a smaller rig. Even with a high percentage of recast material, the 2½-yd. dragline meets all timetables for stripping the 134,000 cubic yards of muck, and another 191,000 cubic yards of unsatisfactory material. When the digging is done, the dragline is ready to take on clamshell or crane work anywhere on the job—or move on to the next contract.

Flaco opened two borrow pits, one for each end of the job. The pit at the south end (in the foothill sector) is right off the right-of-way. It is a set-up for scrapers, with high-type access roads and an average 4,000-ft. haul cycle. A fleet of Allis-Chalmers TS-260's and Cat DW21's (push-loaded by a Cat D9) moves the clayey sand backfill to the cut. Laidlaw Construction Co., building a bridge over the GM&O railroad and Moffett Road, pulls fill for approach ramps from the same pit.

Finding fill for the north end of the job posed more of a problem. With no hills convenient, Flaco moved further afield, to a pit about a mile from the job. This called for a change of strategy. Scrapers just wouldn't do on a long haul over public highways. So the contractor rented a fleet of twelve dump trucks.

Milk Run

The truck drivers have the haul down to a milk run now. They wheel the big Mack tandems under the dragline in the pit with casual skill that makes it look easy. A Link-Belt Speeder LS-98 dragline, wielding 1½-yd. bucket, fills each truck in five passes. If the trucks bunch up in the pit, as they sometimes do on a long haul, an International TD-20 tractor, with Drott Skid-Shovel front-end loader, pitches in to keep things moving. (During peak periods Flaco adds a Lima 64 dragline to load out fill.)

The truck driver waits for a horn signal from the dragline operator, then eases his loaded rig along the ramp out of the pit. He stops to check both ways before he pulls out into the county road. From here it is a twisting downhill run to the main highway. The driver eases the big truck around the corner, then picks up speed till he's in pace with traffic. Just minutes later he pulls off the pavement to dump his load on the sandy subgrade of I-65. On days when road delays posed no problem, the haul fleet placed over 2,500 yards of fill in a single shift.

An International TD-25 dozer levels the fill in 6-in. lifts before compaction begins.

Jerry Pope, job superintendent, explains the wide variety of compaction rigs used by picking up a fistful of the

Continued on next page

Blending water into the sand, a Cat No. 14 motor grader rolls along the fill.

New Life for a 'Drowned' Pit

ONE of the facts of roadbuilding life in low country is that borrowers can't be choosers. Borrow pits close-in to the right-of-way must be exploited fully.

Blount Brothers figured a neat way to mine sand from a pit already written off when digging neared the water table. They scoop out underwater borrow with a large walking dragline.

The scheme works like this. The dragline starts at one end of the pit, dredging a 15-ft. deep pass. Its bucket casts 6½-yd. bites of sand onto the dry section of the pit. There, Caterpillar DW21 scrapers load out the borrow for the haul to the highway.

Does it pay to put an excavator on rehandling work like this? No doubt about it, observers say. The Blount firm kept the machine busy after it knocked off the main muck digging. Besides extending the life of the old pit, the machine earned other savings. Haul distance stayed low. The contractor avoided all the hidden costs of a new pit—land rights, state approval, new haul roads, and clearing and stripping.

Mobile . . .

Continued from page 23

fill material. Not quite sand, and yet not really a clay, the soil falls somewhere between.

"Actually, it's made to order for this type of embankment," Pope says. "With a little care to be sure each new lift bonds to the one below, we build a stable fill that stands off erosion very well."

The biggest problem on the fill is maintaining 11% optimum moisture in the sand. The hot summer sun burns off water almost as fast as it is added. Pope fights this with a fast-stepping spread that blends the water deep into the sand before it has a chance to dry out. Two GMC flatbed trucks, equipped with 1,500-gallon tanks and rear-mounted spray bars, patrol the fill constantly. Right behind them, a Cat No. 14 motor grader blades the soil to thoroughly mix in the moisture.

Next comes a double-drum sheepsfoot roller, drawn by a Case 920 diesel utility tractor. The diamond-shaped soles on the roller feet compact the clay without tearing open the sand. Meanwhile, a vibratory roller (also drawn by a Case 920) packs the sand tightly for the full depth of the lift.

Rolling with a double-header pneumatic-tired compactor—a Tampo unit pulled by a Bros self-propelled—tops off the fill. A couple of passes produces a tight surface that sheds rainfall and resists scuffing by truck traffic.

Flaco's contract ends at the subgrade. The base and pavement for the entire length of the Belt Line will be let separately.

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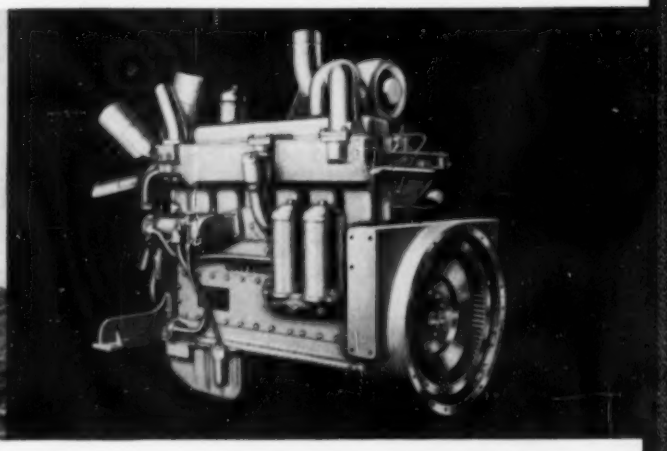

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NEW SERVICING EASE An advanced fuel system is designed for easier servicing and more efficient operation. Compact fuel injection pumps with barrel and plunger assemblies enclosed in housing help reduce wear, lengthen service life.

Plus all the features that made the No. 14B the most versatile motor grader in the "big machine" field . . .

EXCLUSIVE OIL CLUTCH —provides up to 2000 hours of service without adjustment, equal to about a year of "adjustment-free" operation.

DRY-TYPE AIR CLEANER —removes 99.8 per cent of all dirt from intake air. Can be serviced in five minutes.

MECHANICAL CONTROLS —provide easy engagement. "Anti-creep" lock makes blade stay put under load.

FULL VISIBILITY —operator has unobstructed view of job even while seated.

Now, all Cat Motor Graders feature the compact engine. Like the new No. 14C, the 85 HP No. 112E, the 100 HP No. 112F, and the 115 HP No. 12E are all designed to give you the highest production at the lowest possible cost. Your Caterpillar Dealer can give you the facts and figures. He can prove it both on paper and on your job. Call him today.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

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THE NEW NO. 14C MOTOR GRADER— MADE FOR THE BIG JOBS

designed for ACTION!

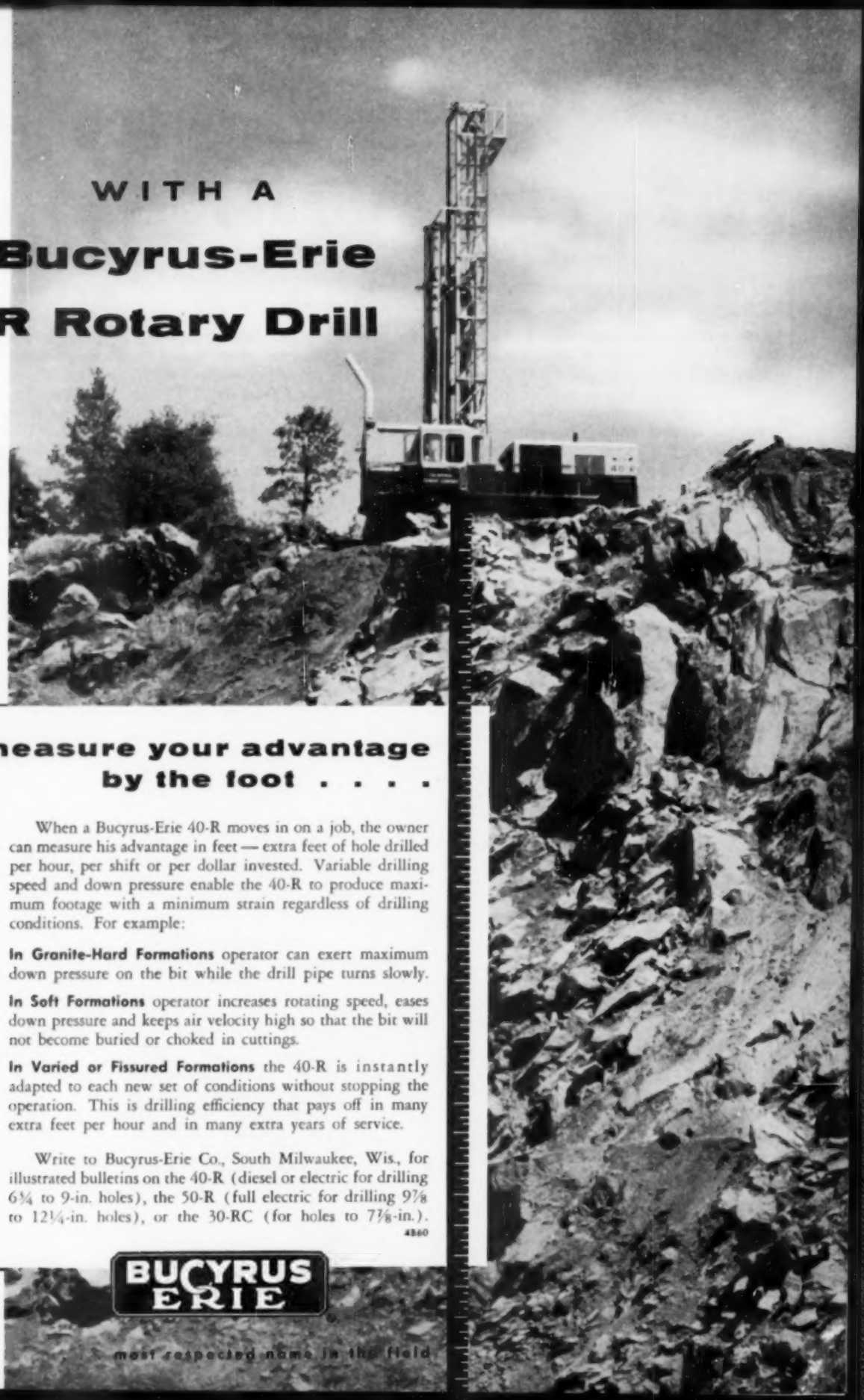
HENDRIX DRAGLINE BUCKETS

built for PROFITABLE PERFORMANCE

Hendrix Lightweight Dragline Buckets

"A Type for Every Digging Purpose"...
¼ to 40 Cubic Yards-Perforated or Solid

HENDRIX MANUFACTURING CO., Inc.
MANSFIELD, LOUISIANA



WITH A

Bucyrus-Erie 40-R Rotary Drill

You measure your advantage by the foot . . . .

When a Bucyrus-Erie 40-R moves in on a job, the owner can measure his advantage in feet — extra feet of hole drilled per hour, per shift or per dollar invested. Variable drilling speed and down pressure enable the 40-R to produce maximum footage with a minimum strain regardless of drilling conditions. For example:

In Granite-Hard Formations operator can exert maximum down pressure on the bit while the drill pipe turns slowly.

In Soft Formations operator increases rotating speed, eases down pressure and keeps air velocity high so that the bit will not become buried or choked in cuttings.

In Varied or Fissured Formations the 40-R is instantly adapted to each new set of conditions without stopping the operation. This is drilling efficiency that pays off in many extra feet per hour and in many extra years of service.

Write to Bucyrus-Erie Co., South Milwaukee, Wis., for illustrated bulletins on the 40-R (diesel or electric for drilling 6¾ to 9-in. holes), the 50-R (full electric for drilling 9⅞ to 12¼-in. holes), or the 30-RC (for holes to 7⅞-in.).

4860

BUCYRUS ERIE

most respected name in the field

"'Live track' power steering rock...SO WE KEEP OUR TD-25

—Asheville Contracting Company,

Shale and blue granite rock make up 85% of the 550,000-cu. yd. of roadway excavation on this contract —5.18 miles of Blue Ridge Parkway construction, for the United States Department of Interior.

That's why Asheville Contracting Company places maximum reliance on their "rock-movers' special": king-sized International crawler power! Where the going's too tough or job progress is too slow and costly with big clutch-steered crawlers, "Asheville's" new 230-hp TD-25 and two veteran TD-24's take over—and "run interference."

"International 'live track' power steering moves more dirt and rock," states M. H. Reighard, Superintendent of rock operations for "Asheville." "Therefore, we keep our TD-25 and TD-24's on trail-blazing and pioneering. The 'live track' feature keeps the blade in the material and makes steep work safer. TD-25 balance enables working 'almost straight up' on mountainous terrain."

Exclusive, years'-proved International Planet Power-steering gives you full-time live power on both tracks to handle full loads on turns as well as straightaways. Load-limiting "dead-track drag" is eliminated. And

moves more PIONEERING"

Asheville, No. Carolina

"live track" power-steering is combined with on-the-go, Hi-Lo power-shifting that lets you match power to load instantly, for full-speed cycles. You do away with time-wasting "gear-shift lag!"

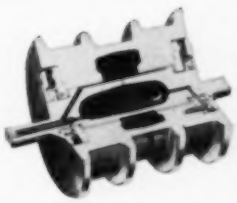
New TD-25 seven-roller tracks are strength-matched to the full effort of the high-torque, 230-hp turbo-charged Diesel engine! The "25" is platformed on shock-resistant, double-box-beam track frames—smoothly carried on International's dual-protected Dura-Rollers, the track rollers that make 1,000-hr. lube intervals practical!

As standard equipment at no extra cost, the TD-25 gives you exclusive, combined Planet Power-steering and Hi-Lo on-the-go power-shifting. And you get this work-speeding design advantage in torque-converter or direct drive model. Here, Asheville's "25" operator is ready to "shift-up" to keep the load on the move.

Power-steer and power-shift the TD-25 with king-sized loads—around curves, upgrade, anywhere! Compare planet-powered "25" ability to deliver full-load capacity, full-time—to outearn other big rigs up to 50%—blading rock, benching, push-loading, mass-production dozing (where fast reverse and decelerator action count), ripping shale! Let your International Construction Equipment Distributor demonstrate!

Even with an enormous offset load of shot-rock there's no "bank-nosing;" no sluing. The TD-25 operator simply operates the load-side track in high-speed range—the other track in low-speed range. Result: full-capacity, straight-ahead performance—the same as the "25" gives on benching, bank-cutting, or side-casting!

Heavy-duty TD-25 Dura-Rollers feature thick, deflection-proof shells; full-floating, precision fitted seals; king-sized lube reservoirs; and exclusive pressure-relief passages that protect seals from overlubrication. These minimum-maintenance track rollers give you practical 1,000-hr lubrication intervals!



International® *Construction Equipment*

International Harvester Co.,
180 North Michigan Ave., Chicago 1, Ill.
A COMPLETE POWER PACKAGE

No Spoil Hauling at Enos

Oakland City (Ind.) coal mine uses two shovel-dragline pull-back teams to strip overburden. Spoil banks are reforested later.

Not the same mine or machines, but photo illustrates pull-back method as used at Enos. Shovel takes dirt from bank at left, moves it to dragline.

by Syd Jamieson

A LEAD article in the September 1932 issue of Excavating Engineer noted: "The Enos Coal Mining Co. uses latest developments in equipment to meet present-day problems believing that . . . new conditions demand new methods." Twenty-eight years later the Enos Coal Mining Co. of Oakland City, Ind., is still employing new strip mining techniques and plant modernization to meet the constant challenge of the nation's coal industry.

A pioneer in the utilization of large stripping shovels, Enos has constantly maintained a high quality of product and a ceaseless effort in lowering production costs. By constantly looking for improvements and readily adapting their operation, the firm has become one of the larger and most modern open pit mines in the Hoosier State.

In 1926, the mining industry learned of liquid oxygen used as explosive material for blasting overburden—an Enos development still in use today. It was Enos who in 1928 installed on its main field a Bucyrus-Erie 750-B equipped with a 12-cu. yd. dipper and recognized at that time as the world's largest electric shovel.

During the lean depression years, Enos management felt that more advanced and larger machines were needed—stripping units to replace old steam shovels and which would move about in the pit without the time-consuming track relocation. These units, though revolutionary at the time, became the forerunners of the present-day giant electric strippers. It was The Enos Coal Mining Co. who developed the "stripborer"—a horizontal drill which provided greater efficiency and economy of operation over the spudder-type drilling machine.

History of the Enos firm centers around its founder and first president, George A. Enos. An experienced veteran in mining operations, Enos was quick to foresee the capabilities of a tract of waste land lying idle in Pike County, Ind., six miles from Oakland City.

Realizing this was coal bearing land suitable for open mine stripping, he immediately undertook a detailed sur-

Dirt dropped by the 1050-B is moved further back on spoil pile by 5-W walking dragline.

vey of the area to confirm his findings. After considerable appraisal and test hole drilling, the land proved its worth for the end product was revealed as No. 5 Vein Indiana.

From the beginning there were problems to be solved and the first of these was getting equipment into the area without rail facilities. Also, once production started, how to relay the processed coal to Oakland City? The solution to these problems was determined by Enos itself when a spur line was built in record time to allow construction of the tipple and preparation plant and installation of two stripping shovels. Initial coal shipment followed and a concerted sales program was established to promote quality of product based upon laboratory-tested methods and coal preparation. In that first year Enos shipments totalled 52,000 tons—today yearly production is near 1½ million tons, about 7,000 tons per day.

Modern Program

Enos died in 1940 and Fred S. McConnell, formerly vice president and general manager, became the company's second president.

The firm in 1946 initiated a complete modernization program to meet the changing needs of the industry. Already the largest and most successful mining operation in Indiana, the decision to undergo this transition was well founded. Changing times required new methods and new markets if specialized industries such as Enos were to survive. The biggest change to the industry was the advent of the diesel-powered locomotives for the railroads. Formerly a large market for the coal industry, the railroads' demands for higher freight rates began to tax the industry to the extent that profits were being squeezed.

Though the railroads were the best customers of Enos, other buyers such as the utilities and industrial accounts were also supplied. However, it was generally recognized that even with the rapid growth of the utilities this market alone would not compensate for the railroad fuel loss being realized. In addition, coal suppliers received higher profit margins from railroad purchases than from the coal sold to the utilities and industries. This was a serious problem which called for the proper solution.

The solution lay in determining how to provide the lowest possible mining cost yet maintain a profit margin which would offset the serious squeeze being faced. The catalyst was a complete reappraisal of Enos stripping operations and life expectancy of its mine field.

(Above) A 50-R drill puts down 10⅝-in. holes on highwall. (Left) W. J. (Bill) Crawford, v.p. in charge of operations, checks Main Field stake marker.

Based upon its production, life of the mine would play out in 10 years time. Earlier Enos had purchased options for an area adjacent to its main field with an estimated reserve of 20 million tons of No. 5 Vein Indiana coal. Surveys of this reserve field had shown depth of overburden was 35 feet at its maximum. It was composed of large rock which would necessitate additional blasting operations. The nature and height of the overburden requires bigger stripping units and loading shovels as well as larger capacity haul trucks. To compensate for this change-over, tipple facilities had to be expanded to handle the additional tonnage expected.

Though the tipple was capable of producing 6,000 tons of prepared coal per day, it did lack the proper equipment for washing material under two inches in size. Enos management also knew that with the additions over the years the tipple was not giving the low operating costs desired. The job of modernization was delegated in

No spoil hauling here as 14-yd. Marion 7400 dragline pulls back overburden from wallbank after being deposited by stripping shovel. One team works each field.

1951 to L. K. vonPerbandt of Mines Engineering Co., Chicago. A year later the new tipple was completed and recognized as one of the most compact and modern preparation plants in the industry.

Since 1952, other additions have been completed or are in progress. For example, two 1,500-ton silo-type storage bins already are being used to good advantage. The bins complement the initial 1,000-ton hopper and are loaded on the second shift. Each storage silo is 40 feet in diameter and 51 feet high. Conveyors feed the coal to the tipple and can be operated individually, along with the main hopper feeding, or a combination of all three. The newest installation to be built was that of a heat dryer with a capacity of 430 tons per hour of 1 x 0 coal. The unit was completed last December.

Enos also pioneered the use of off-track equipment and was among the first to eliminate track haulage from pit to hopper. Increased capacity of haul units complemented utilization of bigger stripping units and loading shovels.

The main and west fields cover 14,600 acres with a 15-year life expectancy. This estimate does not include deep coal reserves. Reforestation is practiced fervently, and in the past 30 years several million trees have been planted. Earthmoving equipment knocks peaks off of spoils producing a rolling terrain where trees are planted by hand—a time consuming practice, but one which is reaping benefits and is beautifully evidenced along miles of haul roads.

Mixed Overburden

Typical cross-section of overburden at Enos is composed of approximately 12 feet of dirt, followed by limestone, shale, sandstone, lime, slate and coal. Seam thickness of No. 5 Vein Indiana is 4½ feet, and is classified as a steam coal. Depth of overburden runs from 12 feet to 104 feet with an average of approximately 60 feet.

Present stripping equipment being used by Enos centers around two Bucyrus-Erie 1050-B electric shovels equipped with 45-yd. dippers. These two units team with a pair of diesel powered 5-W walking draglines with 6-yd. buckets, and a 14-yd. Marion 7400 electric dragline. The 1050-B's have 113-ft. booms with 64-ft. dipper

Modern Tipple

HAUL units release loads at the tipple to a 1,000-ton hopper while on the run. Two variable speed reciprocating feeders direct the coal to a 920-tph, 60-in. apron conveyor. This conveyor feeds the R.O.M. coal to a 4-in. lip screen where the material discharges to a 12 x 17-ft. Bradford breaker where it is broken to 7 inches and under. This discharge falls to a 915-tph, 48-in. belt conveyor and travels to a washing plant. The overs, or hard rock and pyrites rejected by the breaker are transported to a rock bin where they are hauled away. The 7-in. material spills from the conveyor to a dividing hopper where it is split into four parts by feeders and fed to four Tyler F-600 5 x 12-ft. vibrating screens.

Here ⅜-in. sized coal is fed by sluice to two large settling tanks. The overs are discharged to two 5-cell jigs. The coal discharged by the primary elevator of the jigs is screened, and these overs (1½ x ⅜) are fed to a refuse sump and carried to a disposal pond. A conveyor has been installed so the overs can be conveyed to a refuse bin and hauled with other refuse or pumped as desired.

(Left) Autocar heads for hopper with 50-ton load. (Right) Cat No. 12 grader removes falls from West Field seam surface.

Setup

The ⅜-in. size goes to a Rheo feed and the 1½-in. size joins the middlings discharged by the secondary elevator of the jigs. This material travels by belt conveyor to a 9 x 11-ft. Bradford breaker equipped with 1½-in. holes.

The overs or plus 1½-in. are discharged by the breaker as waste to a 100-ton capacity refuse bin, where it is trucked away. The 1½ x 0 is again screened and the unders move to a Rheo feed while the overs are recirculated to the jigs. From the jigs the coal is fed by sluice to two classifier shaking screens while the washed coal is sized to 7 x 4, 4 x 3, 3 x 2, 2 x 1½, 1½ x 1 and 1 x 0-in. sizes. Washed coal above 1½-in. size is fed separate or blended by two mixing conveyors and loading booms to railroad cars. This material is also screened 1½-in. and under.

Tipple facilities for preparation of washed coals can also blend 1½ x 1-in. with the plus 1½-in. if so desired. Two 5 x 12-ft. Allis-Chalmers Low Head sizing screens take the 1 x 0 material and size it down to ⅜-in. The 1 x ⅜-in. moves by belt conveyor where it is discharged to a separate bin in the fine coal blending plant. The ⅜-in. material

General view of Enos Coal Company's tipple. Daily production is 7,000 tons.

plus water is carried to a Tyler Niagara 4x16-ft. dewatering screen where ⅜ x ⅛-in. material is removed and fed to a conveyor transporting ⅜ x ⅛-in. material to a bin. At this point the ⅛-in. size is directed to the Rheo feed where it is rewashed.

Coal Washers

Raw coal which is fed to the fine coal washer is delivered by pump or sluice to two settling tanks and conveyors. The settlings go to a surge hopper where variable speed-screw feeders direct the settlings onto four-lane, free discharge Rheo launders. The washed coal then moves to Allis-Chalmers 5 x 14-ft. Low Head dewatering screens where ⅜ x ⅛-in. material is separated and discharged to a conveyor which feeds this material to a storage bin. A 4 x 14-ft. Allis-Chalmers dewatering screen takes the ⅛ x 0 plus water and directs the 28 mesh to one H & P Reinevald dryer. From the dryer the material is conveyed by belt to a storage bin.

Wastes from the Rheo dewatering operations are fed to a refuse sump which pumps the material at 2,035 gpm to the disposal pond. After settling, the water is recirculated. Loading of prepared coal is done by conveyors feeding overhead booms and by car retarder operation inside the plant. Washed coal is fed from surge bins by variable speed feeders and is blended or mixed in various combinations. There are eight loading sizes from 7x4 inches, to 10x28 mesh.

handles. Enos spots a 1050-B in each of two pits with a 5-W drag pulling back from one and the 7400 from the other. The pull-back teams eliminate all spoil hauling. By proper proportioning of the shovel's dipper size with the dragline's bucket size, a fine work balance is achieved between the two machines and the estimated depth of overburden. This method gives the maximum production possible since the real efficiency of any excavator is measured by its ability to put material away.

The 1050-B's, biggest at the time, were purchased with the pull-back operation in mind. Output for each is 33,000 yards per 24 hours, with cost varying according to height of bank being worked. When the ultimate spoil height is reached, the bank

Electric 100-B with 7-yd. dipper loads into bottom-dump on coal seam. Wall is limestone, shale, sandstone and slate. Seam is 4½ feet thick No. 5 Vein Indiana.

is utilized for trees or grass. Cat equipment is detailed for utility and cleanup in pit areas. The fleet includes three D8's, a D7 and six D6 bulldozers. Two No. 12 motor graders remove falls from seam floor and help with road maintenance.

When needed, a Cat D8 scraper builds dams on the highwall for water protection and is also utilized for road construction. Haul roads have little grades and are excellently maintained.

Drilling units are two Bucyrus-Erie 50-R electric rotaries equipped with Gardner-Denver compressors. Drill crews work a 30 x 27-ft. hole pattern back from ledge of the highwall. Hole is 10⅝-in. diameter with an average depth of 60 feet. Drill bits for the 50-R are used as much as 12,000 feet and 25,000 feet respectively in the two pits and are supplied by Chicago Pneumatic. Drilling production during a 6¾-hour working day is 650 feet in the main field pit and 800 feet in the NW pit per shift. For occasional side-wall drilling, Enos employs two Joy electric side-wall drills. There is no water required in the drilling.

As mentioned earlier, Enos has its own liquid oxygen plant—one of the few of its kind in the United States. Carbon is supplied from Great Lakes Carbon of Chicago. Ammonium nitrate fertilizer grain from various sources is also used. Enos at present, in collaboration with Atlas, is experimenting with various gels for primers, and shortly ammonium nitrate will replace liquid oxygen completely.

All shots fired contain milli-second connectors which delay the firing of holes so that no two holes are fired simultaneously. This provides better fragmentation and reduces blasting vibrations.

Powder ratio averages 4 cubic yards of overburden per pound. Number of shots vary according to depth and type of overburden, but range between 200 to 700 pounds of explosive per hole. When L.O.X. is used an average of about 15 holes are shot at a time. Frequency of shots vary again but generally run two to three shots per day with approximately 20,000 to 25,000 yards exploded per shot. Pattern is set for two shots in one pit per day and a single shot in the other. Because of the use of liquid oxygen, shots must be fired in less than an hour. Fragmentation is good.

Cleaning of the coal seam is done by a Cat D6 after the stripping shovel has cleared the floor of overburden. If there are any falls on the seam, they are cleaned or removed prior to loading. Loading is done by a Bucyrus-Erie electric with a 7-yd. dipper. Enos finds it is not necessary to drill or break the No. 5 Vein. In addition to the primary loading by the 100-B, a 5-yd. 75-B electric is also used. A 50-B with 3-yd. dipper is retained as a standby unit. Haul performance is on a two-shift per day routine.

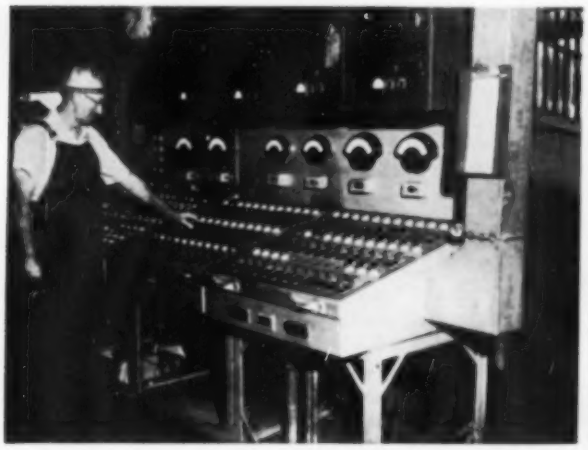
Enos haulage is a story in itself. Originally an all-track method, the advent of rubber-tired hauling units resulted in a truck-track combination. It soon became 100% truck haulage. Present day hauling units at Enos are 50-ton Dart semitrailers powered by 300-hp Cummins diesel engines, and 55-ton Autocar semitrailers.

These bigger capacity units have replaced 12-ton end-dumps and 25 and 35-ton tractor-semitrailers. Here again larger capacity machines have complemented the latest stripping shovels making for a more efficient operation. It has been estimated that as much as 50% savings has been realized on cost-per-ton mile with the utilization of the 50-ton haulers.

Shortly after the off-track trucks were put into use it was soon realized that steam locomotives and cars were outmoded and newer methods of haulage would have to be determined. The answer led to the installation of electric locomotives equipped with 40-ton coal cars—the first application of electrically-powered haul units at any strip mine in the United States.

In the late 1940's, rubber-tired haul units had proved so successful that the company divorced itself completely from the track-haulage combination and went to the bigger capacity 35-ton tractor-semitrailers powered by 200-hp diesel engines. These units teamed with 12-ton end-dumps and provided a fleet of 26 rubber-tired haulers.

In 1955, President McConnell retired from the firm and was succeeded by George E. Enos, son of the company's founder. Other officers of the company are P. W. Albrecht, treasurer, and Willard J. Crawford, vice president in charge of operations. Pickands Mather & Co. are the exclusive sales agents for the Enos mine.

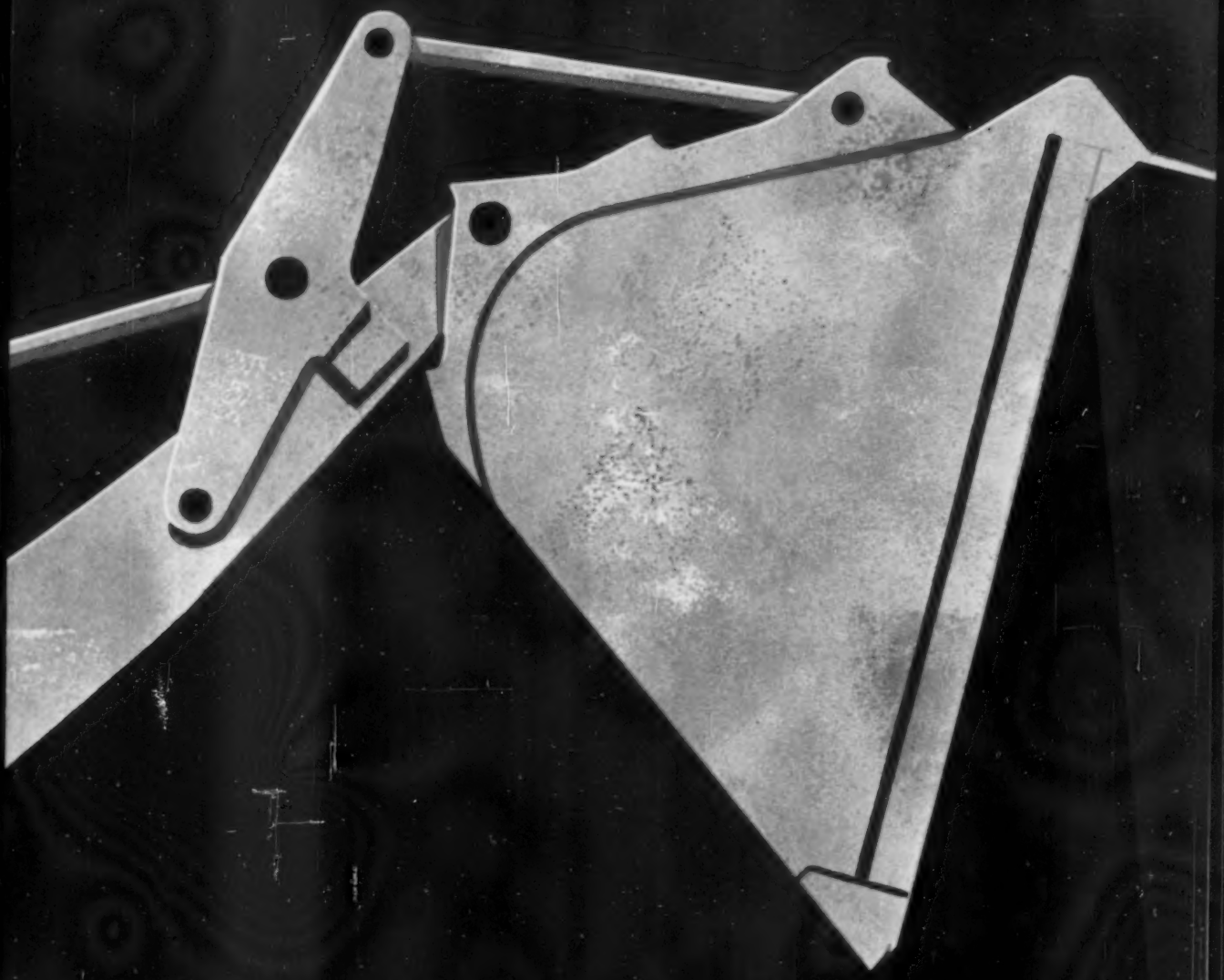


Bill Fleener, washbox operator, checks reading on tipple's master control panel. Plant dates to 1952.

Superintendent W. E. Chanell, Office Manager E. E. Atkinson and Chief Engineer C. R. Barnard keep production rolling. Trio has over a century of service.

BRAND NEW...WITH 7 YEARS' PROOF!

THE GREAT NEW LINE OF CATERPILLAR WHEEL LOADERS



THE NEW 966...2 3/4 YD.,

THE NEW 922...1 1/4 YD.,

Power Shift Transmission. It's Cat-built . . . gives smooth, instant shifting for 1st-2nd speeds . . . forward and reverse. In high-speed travel range, the machine is in 2-wheel drive. A shift to work range puts power to all four wheels for full traction when it is needed.

Operator Safety. Lift arms and cylinders are all forward of the cockpit . . . giving complete freedom of movement. Visibility is excellent at all times. It's easy and safe to get into a Traxcavator from either side . . . up three wide steps. Tires are shielded by fenders.

Operator Convenience. Bucket controls are on the right side, leaving the left hand free for machine operation. The forward-reverse lever is mounted on the steering column for finger-tip shifting without decelerating; 1st and 2nd, high-low range levers placed at left of seat.

Automatic Bucket Positioner. With bucket loaded, lift lever is put in up position. The bucket goes up to dumping height and the control kicks into hold position automatically. While lowering after dumping, a pull on the tilt lever automatically positions bucket for digging.

There's a long history of extensive testing and development behind these new machines. They've been thoroughly proven in a long research program. And you're getting the full benefit of Caterpillar's 23 years of loader leadership . . . 20 years of wheel-tractor building.

All three wheel loaders have been tested, strained, tortured . . . with a field force of Caterpillar engineers watching every move . . . around the clock. After final refinements, these machines went out on customer jobs all over the country. They proved themselves with an unmatched combination of speed, operator safety and convenience, high production and traditional Caterpillar dependability. They're ready now . . . with no compromises.

PROVEN IN 7 YEARS OF TESTS...THE NEW 922 AND 966

THE 922 TRAXCAVATOR—1¼ CU. YD. BUCKET

Proven on the jump-and-run jobs

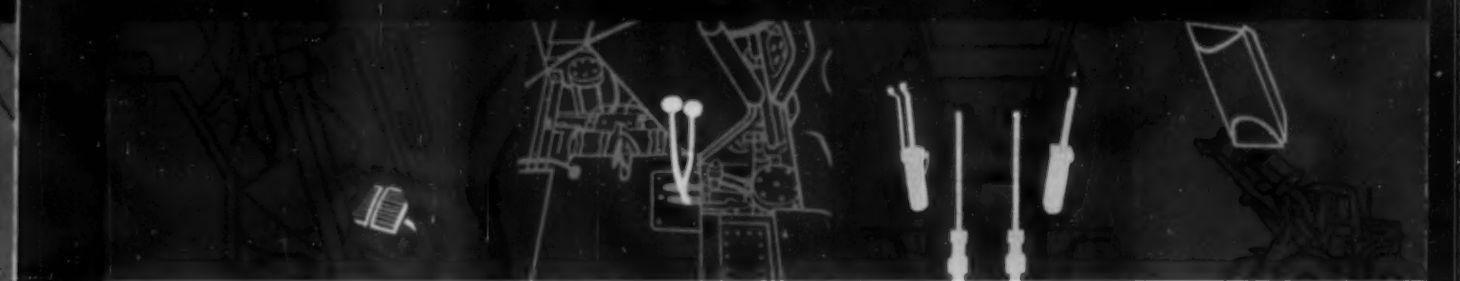
• 80 HP. Choice of compact 4-cylinder Cat turbocharged Diesel Engine (uses low-cost furnace oil) or 6-cylinder gasoline engine with big displacement for long life and sustained power. With either engine you have one source of warranty . . . one source of parts and service . . . your Caterpillar Dealer. • Long 41" reach at 7' dumping height . . . maximum lift of 11' 2".

THE 966 TRAXCAVATOR—2¾ CU. YD. STANDARD BUCKET

Proven on jobs where time is measured in tons of material loaded

• 140 HP from the Caterpillar D333 Diesel Engine, turbocharged for extra efficiency and quick acceleration in machine drive and bucket hydraulics. • 57" reach at 7' dumping height with a maximum lift of 12' 10¼". • LIVE ACTION HYDRAULICS for tough material excavation, fast lift and dump. • DUAL-RATIO STEERING for work and highway travel. Gives operator easy, quick turns for fast maneuvering on work cycles, safe automotive-type steering for high-speed traveling.

BOTH THE 922 AND 966 HAVE ALL THESE PROVEN FEATURES, INTRODUCED BY THE POPULAR 944 TRAXCAVATOR



Dual Brakes. The left brake neutralizes the transmission as it stops the machine. This transfers extra power to the bucket . . . assuring full loads even in tough material. The right brake stops the machine with the transmission engaged . . . giving full machine control.

Easy Service Access. The seat tips forward for easy access to transmission oil filter and control linkage adjustments. Unit construction allows independent removal of engine, transmission, other major components. The dry-type air cleaner can be serviced in about 5 minutes.

Live Action Hydraulic System. Plenty of power from the engine is always available to the hydraulic system for fast bucket action. Control valves are enclosed in the steel reservoir for complete protection. The Caterpillar Live Action Hydraulic System is full-flow filtered for trouble-free operation.

Available with a Complete Line of Attachments. There are special buckets for light or heavy materials, forks and the exclusive Side Dump Bucket that cuts maneuvering time and space because it dumps to the left as well as forward. A fiber-glass cab is also available.

● Herff and Fred Harris, owners of the Harris Sand Pit, Von Ormy, Texas, bought a 944 in April and another in June. The first machine was put to work 12 hours a day, 6 days a week. In June its service meter read 740 hours. "We haven't had a minute's down time," said Herff Harris. "This machine's been working! We like everything about it and especially the basic design that gets the lift arms out of the operators' hair. We figure the speed of the machine plus the automatic bucket positioners give us at least 25% more production than other machines of the same size."

FROM THE FIELD:

HERE'S WHY THE 944 HAS GAINED ACCEPTANCE UNMATCHED IN MACHINE HISTORY

● At the Clarksville Stone Co. near Clarksville, Tenn., Charles Day speaks his views of their 944: "I believe this new Traxcavator is the best machine in its class and for several reasons. One is that open, clean deck; our operators are on and off the machine a good deal and on the 944 they can just walk up, sit down and go to work. And I've noticed the stability of the machine is better than the rest; the 944 doesn't tip—it stays on the ground. I've heard our operators talk enthusiastically about the easy controls and especially the automatic bucket positioners. Our best operators are better on the 944."

If there's a 944 operating in your area, chances are you'll get this kind of impressive report from owner and operator. But for the whole story on all 3 wheel loaders, there's only one man to see—YOUR CATERPILLAR DEALER. His staff of materials handling experts and heavy equipment specialists has the full story on the wheel loader line that's brand new with features, but 7 years old with experience. Ask for a demonstration on your job ... see how these wheel Traxcavators make other loaders obsolete.

Caterpillar Tractor Co., General Offices, Peoria, Illinois, U.S.A.

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ADVANCED AS TOMORROW
CERTAIN AS YESTERDAY

PLAY IT SAFE

Do you want low cost or low price? There's a whale of a difference. Bucyrus-Erie excavators — as has been widely demonstrated — don't eat owners out of house and home with maintenance and upkeep costs. Moreover, on the records of hundreds of owners, they stand head and shoulders above others on low cost per yard produced.

And when modern improvements are added, as they are constantly, they won't be "made available," they'll be **standard** . . . because you expect it with a Bucyrus-Erie.

5-YARD SERIES TWO 88-B . . . a good example . . . can be diesel or single-motor electric-powered. Diesel model has twin-governor dual control as standard equipment . . . different crawler mountings to fit your job . . . a strong shovel or dragline front end that swings more payload, less dead load.

Invest in a Bucyrus-Erie and find out what low-cost production really means to profits. Bucyrus-Erie Company, South Milwaukee, Wisconsin. 41E60

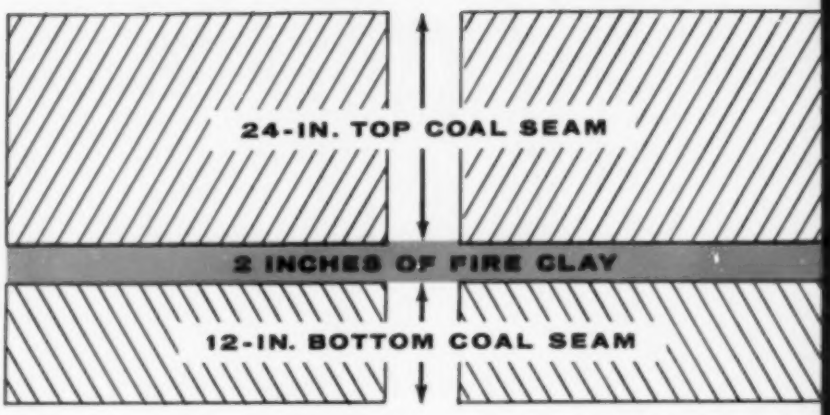
Owner, Southern California Edison Co., Edison Building, Los Angeles, California.

. . . most respected name in the field

BUCYRUS-ERIE

How KIRKVILLE COAL COMPANY solved split coal seam problem

and reduced ash content with SKOOPER loading...



Study the diagram. You'll quickly see the coal-clay-coal loading obstacle at one of Kirkville Coal Company's open pit mines in Missouri, near the Iowa state line. The 2-inch layer of clay splits a 36-inch vein of high-quality bituminous coal. Mixing in clay during coal loading causes too high an ash content . . . lowers B.T.U., and reduces market price.

As President C. E. Hanson puts it:

"Split veins in this area have always made it all but impossible to remove coal without getting a high percentage (7 to 8%) of ash due to the clay seam. Standard shovels with coal-digging buckets heeled into the clay, while tractor-type and 4-wheel-drive front-end loaders constantly dug into the clay with their tractive systems."

He further reports . . .

"Koehring Skooper proved to be the ideal machine for the job. With its 7-foot level crowd, clean coal can be shaved off *with 2% less ash.*" What's more . . . Skooper's powerful break-out force, coupled with level crowd action, makes digging the coal an easy job. Consider this, too . . . Skooper's 2-yard bucket (on basic ½-yard machine) takes full advantage of only 64 horsepower . . . makes the most efficient use of the little fuel it consumes! That's because, with Skooper's unique "stand-still" loading cycle, full engine power is concentrated on the digging effort . . . and not on unnecessary traveling.

5 months with no down-time

"Since the start of our busy season 5 months ago, the Skooper has worked 8 hours a day, at least 5 days a week without a single hour's down-time," Mr. Hanson reports . . . and adds, "For coal digging and loading, I feel that it's the most efficient equipment on the market!" Isn't it time *you* tried Skooper? Call Koehring distributor, or write us about it today.

See your distributor about the Koehring Equipment Show. Waukesha, Wisconsin. Week of September 19.

KOEHRING
DIVISION OF KOEHRING COMPANY
Milwaukee 16, Wisconsin

There's nothing like it — on wheels or tracks!

Koehring 1205 strips Kirkville coal

Working just ahead of Skooper at 3,000-acre Kirkville mine, this Koehring® 1205 is stripping approx. 24 feet of overburden. Materials range from common earth and clay to shale and ledge rock. 1205 output? About 4300 yards per 16-hour day! It's equipped with 3-yard dipper on 40-foot boom, 30-foot stick . . . has been stripping at Kirkville mines for over 2 years. K24

MAKES 7-FOOT LEVEL CUT... SWINGS, LOADS OUT... WITHOUT MOVING TRACKS!

KOEHRING® SKOOPER

KOEHRING HEAVY DUTY

(Left) This loose, dry, blow sand reservoir was rendered practically watertight when drums of SS-13 in foreground were added. (Right) Mixing of SS-13 can be handled in several ways. Here it's being churned by an outboard motor.

New Chemical Halts Water Seepage

Contractor's No. 1 problem is providing water for dry roadbuilding job. Here's how he whipped it without lining sides of the job's storage pond.

by Floyd Suter Bixby

PROBLEM No. 1 wasn't earthmoving, the construction of culverts or bituminous surfacing when Royden Construction Co. of Phoenix bid $333,330 for the construction of 4.8 miles of Arizona state highway. The prime source of concern on this job was water. And it will be the No. 1 problem until the project is finished.

What's being done to solve the problem promises to be a blessing in chemical disguise to many a highway contractor in the arid southwestern states. A new chemical called SS-13 is being used to reduce seepage losses in the job's storage reservoir. About 70% of the loss by seepage has been stopped, despite the fact that the storage reservoir was bulldozed out of a sandy, gravelly desert floor.

The new chemical was developed by Brown Mud Co. of Torrance, Calif., after 3½ years of laboratory and field research, and consists of resinous polymers and heavy atoms, mixed in a carrier of common diesel fuel. Its function is to increase the ionic attraction of the soil particles for water, thus increasing the thickness of the hydroscopic envelope of water around each particle. This decreases the voids of passages through which water can move; retards water flow through soil. Wherever the chlo-

(Left) Coming out of borrow pit, Euclid S-18 throws a cloud of dust. (Center) Optimum moisture is evident on the fill.

make the storage pond practically watertight.

Development of an adequate water supply to pour about 170,000 gallons a day into the job was considered sufficiently important that the Royden firm sublet this work to Industrial Pipelines, of Holdredge, Neb., specialists in the development of water. It was realized from the outset that an adequate water supply for this job would be the No. 1 problem, chiefly because the only adequate source then known was a 200-gpm well at an airbase 6 miles from the job.

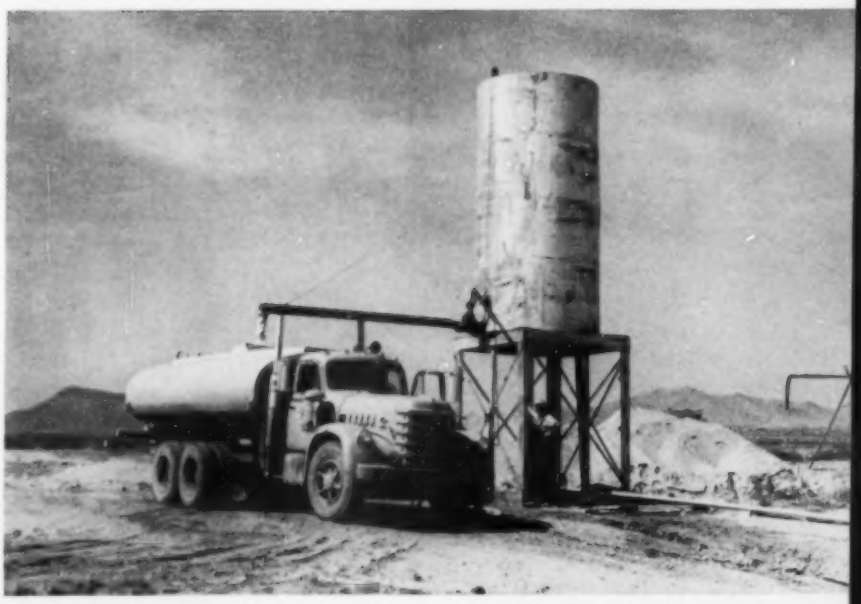
The subcontract firm made a strong attempt to develop water on the job

ride content of the soil is between 150 and 1,100 parts per million, the results are almost always excellent.

The SS-13 material was furnished to the job by SS-13 Sales Co., of Phoenix, national distributors for the product. It was mixed into the storage pond at a ratio of one gallon of material per 1,000 gallons of water.

Porous Soil

It took some doing, because the reservoir had been so porous that pumps had worked all day to build up 2 feet of storage in the bottom of the pond—and that was lost overnight before the chemical was put in. Next morning, however, when the pumps were started, the chemical was injected with a stream of water. A few days later after the reservoir had built up, additional SS-13 was added to



This 5,000-gallon tank sprinkler on truck mounting gets load of water for the fill.

(Right) Compaction is delivered by a Cat D8 tractor pulling a double set of LeTourneau-Westinghouse sheepsfoot rollers.

Marlow 4-in. pumps at the reservoir put stored water through standpipes into trucks. Pond is still milky from SS-13.

by calling in McDaniel & Co. of Tucson to drill and develop a water well. McDaniel, using churn-drill equipment, went down 380 feet on the first try, but the hole was dry. A second well, drilled 950 feet deep, produced only 15-gpm—adequate for a stock-watering pond, but not productive enough to supply a thirsty highway job. At that point, Industrial Pipelines gave up drilling and installed 6¼ miles of 4 and 5-in. quick-coupling aluminum pipe from the airbase supply to the job. A Chrysler butane-powered gas engine with a 4-in. Gorman-Rupp centrifugal pump was set midway in line to act as a booster, helping the water along to the storage pond. The storage pond, which is located a mile from the north end of the 4.8-mi. job, has three outlets.

Overflow Stored

Water from the aluminum pipeline is first pumped directly into a 6,000-gallon elevated storage tank with quick-opening valves, and this overflows into the pond. Two standpipes also can load water directly from the pond. These standpipes are both powered by 4-in. Marlow centrifugals, one driven by a LeRoi gasoline engine; the other driven by Wisconsin power.

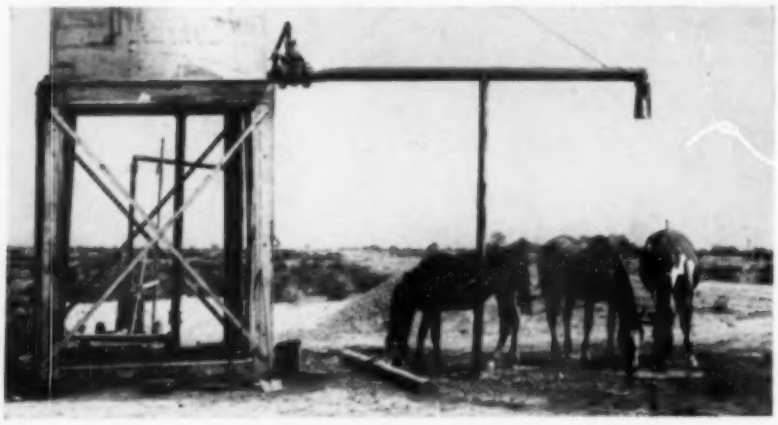
Hauling to the job are a Sterling 4,300-gallon water truck; a 4,500-gallon tanker on a General Motors 650 truck; a 4,000-gallon tanker on a Diamond T; and a 5,000-gallon tanker on a Mack B-73 diesel. Marlow pumps also are used on each of these trucks for unloading water.

The 130,000 cubic yards of roadway excavation on this project are being graded and borrow loaded by two Euclid S-18 scrapers and two Caterpillar DW21's. Pushloading is being done by a Cat D9 and a D8. Two Cat D8's serve as dozers, and there are also two No. 12 motor graders on the job. A D8 is used with a dual set of LeTourneau-Westinghouse 120 sheepsfoot rollers, and an International TD-18 also pulls a set of the same type of sheepsfoot rollers. Thanks to direct sprinkling on the freshly laid 6-in. lifts, Royden has been able to get 95% compaction with these machines.

The job will be finished by the time this reaches print, and when it is, it will be a tribute to the new chemical which enabled Royden to set up a workable storage reservoir. If this hadn't been done, there would never have been enough water, and the job would have lagged far behind schedule.

Harold R. Bone (left) manager of SS-13 Sales Co. of Phoenix, checks a technical report with his assistant, Robert Ewing.

One of the questionable factors about SS-13 was: "Will it kill livestock?" Here's evidence that it won't. Horses from a nearby ranch are making the job watering tank their headquarters. This water has fresh SS-13 chemical still in suspension.



Diesel Hammer + Crane = More Earning Power

"Handiest thing we ever hung on the end of a crane boom." That's how a contractor describes the diesel hammer.

YOU may be missing out on a broad new dimension of crane profit if you're not up to date on diesel power. Not the kind of diesel power that drives your rigs. The kind that drives piles.

The diesel-hammer—a self-contained, self-powered package—is changing a lot of old-fashioned ideas about the cost and clutter of pile driving. Here is a unit that combines full-power wallop with the portability of simple drop hammer.

"We keep our cranes busy full time since we added the diesel hammer," says a New England excavating contractor. "It never gets a chance to cool off. Today we're driving sheeting for a sewer line. Tomorrow we'll be on a footing job for a culvert on the other side of town. The hammer paid for itself already on time saved in jumping from job to job."

For the diesel hammer is to pile driving what the compact car is to the auto industry. It is a miser on fuel. It packs "to go" in minutes. Its light weight saves handling trouble on each move.

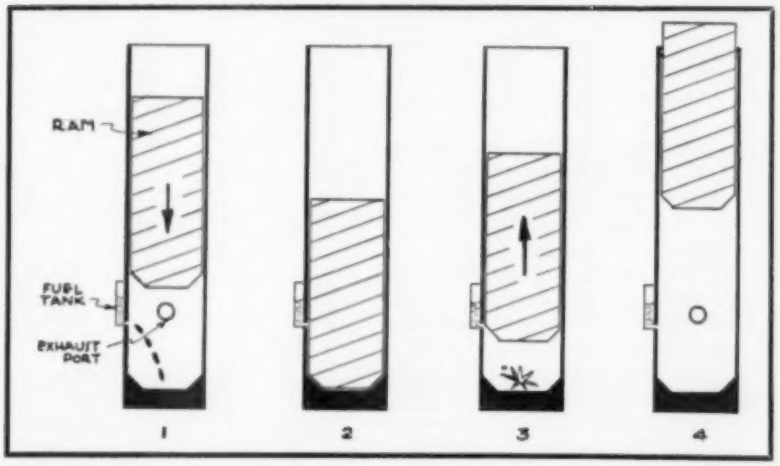
Tight spot to work in? No sweat. Free of boilers, compressors, hose lines and valves, the diesel hammer goes anywhere a crane's boom can swing it.

German Development

The diesel hammer was developed in Germany just prior to World War II. Up to five years ago, however, it made little impact on this side of the Atlantic. Then the Navy took a close look at new methods for pile driving. The proving grounds at Port Hueneme, Calif., ran a series of tests, pitting a diesel hammer against hard soil and big piles.

The verdict: It's a natural for hit-and-run work. The compact hammer takes little cargo space. Within minutes after it arrives at the job site, it is ready for work. Driving power checked out top rate, too. In one test, a lightweight diesel hammer pounded home the 35-ft. long section of a husky steel bearing pile. Took just over 6 minutes, and about a quarter gallon of fuel.

Special driving cap enables 30,000-ft.-lb. diesel hammer to drive prestressed concrete piles without bending the reinforcing bars that protrude.



Operation of diesel hammer follows a four-step sequence: 1) fuel injection; 2) compression; 3) power; 4) exhaust. Only moving part is the piston or "ram."

The beauty of this new type pile hammer is its simplicity. It has only one main moving part—the piston (or ram, as it is usually called by pile men).

What you have here is a one-lung free-piston engine. Only instead of turning a crankshaft, explosion of fuel in the cylinder slams home piles.

Let's look at a typical operating cycle. Keep your eye on the bounc-

Batter piles can't faze this diesel hammer working on a highway bridge foundation in Fort Lauderdale, Fla. A 38-B crane with 90-ft. boom easily handles the 60-ft. long leads. This McKiernan-Terry model DE-30 hammer delivers 32,000-ft.-lb. blows, and drives home nine 35-footers (18 x 18-in. section) in a typical work day.

ing ram. It is the key to what's happening—in the hammer and on the pile:

1) Fuel injection—On the downstroke the ram triggers the fuel pump. A measured amount of No. 2 diesel oil squirts into the cylinder.

2) Compression—The ram seals the exhaust ports. Now the trapped air is compressed. It gets super-hot. It also exerts push on the pile, a preloading force that helps break skin friction before the actual blow hits.

3) Power—The ram hits bottom. Splat! The puddle of fuel oil sprays into the hot compressed air. Wham! The mixture ignites. A powerful blast kicks the ram upwards, and at the same time delivers a mighty punch to the pile.

4) Exhaust—The ram rides up until gravity slows, then reverses it. Waste gases sweep out through the exhaust ports. Clean air rushes in.

Now the cycle repeats, to the tune of 50 or so beats each minute. (Sealing the top of the cylinder—a feature of one make of hammer—cuts cycle time. The trapped air acts as a spring to speed return of the ram.)

Hard driving conditions show off the hammer's power to best advantage. In fact, the more resistance offered by the pile, the better the hammer works.

"Look at it this way," a crew chief explains. "If a pile is going through hard material, the ram delivers a solid kick each time. You can see why if you try this simple trick: Swipe a cap from your kid's toy gun. Try hitting

Diesel Hammer Facts

PANACEA for pile problems, or just husky driving power—which is the diesel hammer? It depends, experts say. On the kind of piles you're driving, where you are driving them, and the soil at the job site. Each type of hammer has its own driving characteristics, they warn, just as each type of clamshell bucket has its own digging characteristics.

Here are a few quick facts to help you size up diesel pile driving against your job needs:

Size range—Hammers are rated on the striking energy (in foot-pounds) they deliver. Diesel units range in size from about 5,000 up to 35,000-ft.-lb. sizes. The top hammers have ample power to drive the largest pile sections in common use today.

Saves Weight

Crane capacity—For a given level of striking energy, the diesel hammer generally saves many pounds of dead weight. This reflects in the size of crane needed to handle the hammer. A Bucyrus-Erie 38-B, for instance, can easily swing the biggest hammer made—with plenty of lift left to snake in full-length piles.

Fuel consumption—You can figure about two gallons of No. 2 diesel fuel an hour for small hammers. The biggest hammers use half again as much. Each hammer has a built-in tank with enough fuel for an average day's work.

it with a hammer when it's on the grass. Not much reaction. Now put the cap on a sidewalk and hit it again. You'll get the same kind of bang a diesel hammer gives when it's up against hard going."

Want to see that extra driving power in action? A midwestern contractor can show you what it means in terms of more piles per shift—and less cost per pile.

"Matter of fact," he'll tell you, "our crews just about doubled their former driving rate. And since the diesel hammer came on the job, we field two crews with the same manpower one used to take.

"Watch the men set up for a day's work on these footings," he says, pointing to the spread as it rolls up to a factory site. There's a 45-ton truck crane, and a semi-trailer loaded with the diesel hammer and the leads —a spindly tower that guides the hammer onto the pile top.

"We used to have more roustabouts than a circus handling this," the contractor points out. "Now you see what it takes to hang the leads on the boom and slide the hammer into the leads? Two men—the crane operator and a ground man—and about 15 minutes' working time."

FOR 50 YEARS...
Finest in the Field!
Rely on the bucket contractors rely on. The Omaha Dragline Bucket gives full load with every cast. Perfect balance makes it easy to spot dump. Alloy steel cutting teeth stay sharp, tough and ready. Strike pay dirt now! Complete information and specifications await your letter.
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DRAGLINE BUCKETS

Simple I-beam leads, built in a contractor's shop, guide a 20,000-ft.-lb. German-made Delmag hammer onto the head of 18-in. square concrete pile. The hammer uses about 2 gallons of No. 2 diesel fuel an hour.

It's true. In one deft motion, the operator flops the leads flat, and yanks the hammer onto its guide rails. Then he swings hammer and leads aloft and turns the rig toward the first pile, already set in a timber driving template. The ground man holds the tag line taut, guiding the leads till they nestle around the pile.

Lug Tripped

"Starting is easy," the crew foreman chimes in. "See that load line hooked to the side of the hammer? When the crane reeves in the line, a lug catches the ram inside the cylinder. At the right height the lifting lug automatically trips and the ram falls free."

He gives the crane operator the high sign. The engine springs to life and there's a familiar whine of the hoist drum. The men all watch the hammer. Slowly the shiny ram rises from the top of the cylinder. Then it's gone. A second later a sharp bark splits the air. The pile sinks almost a foot with the impact. And the shiny ram pops out the top of the cylinder again, hesitates, then starts down.

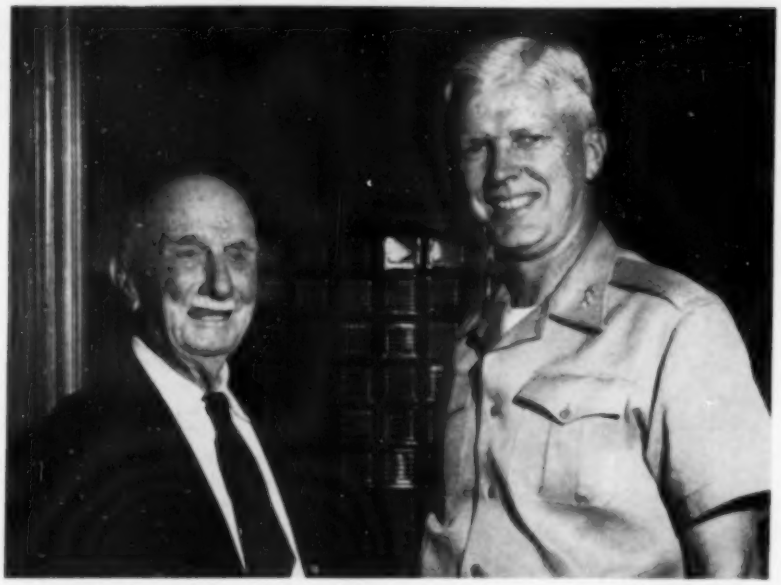
The smell of diesel oil hangs heavy in the air. But the foreman, ticking off beats of the hammer on a hand counter, notices only the foot markers painted on the pile.

"When it takes 200 blows to advance one foot, we call it quits," he says. "That amounts to refusal in this clay hardpan. It doesn't take long to make it either. Driving time for these 50-footers averages around 15 minutes."

Almost as if on cue, he signals the ground man, who is holding a cord line hooked to the hammer's fuel feed. He yanks the line. On the next downstroke the ram bounces feebly, then stops.

The contractor sums up reaction to the diesel hammer this way:

"Sure, it has top driving power. Believe me, that shows up on job progress charts. But what we appreciate most is the extra earning power the hammer gives our cranes. That shows up on the plus side of our balance sheets."



THE PRESIDENT MEETS THE DEAN—On his first tour of U. S. Army Engineer District, Memphis, Maj. Gen. Thomas A. Lane, president of the Mississippi River Commission, visited the office of the St. Francis Levee District of Missouri in Caruthersville, Mo. He was greeted by Chief Engineer Sterling Price Reynolds, 99, who is still active in the job he has held since 1900. Reynolds is known throughout the lower Mississippi valley as the dean of flood control engineers.

NEWS *from the* FIELD

Missouri Pacific Builds Ore Mine Line

Work is currently nearing completion in southeast Missouri on what is probably the largest piece of new railroad track in the nation. Whereas railroad news has, in recent years, included stories of track abandonments and curtailed services, Missouri Pacific Railroad forces are now putting the final touches to a 28-mile stretch of brand-new railroad some 70 miles south of St. Louis.

Costing an estimated $4 million, the new line will serve the $40 million Pea Ridge iron mine being developed by the Meramec Mining Co., a joint enterprise of Bethlehem Steel Co. and the St. Joseph Lead Co. The rich iron ore deposits in the region contain an estimated 100 million tons, with tests indicating that the ore is from 55 to 65%, as compared to 25 to 51.5% for the Mesabi range in northern Minnesota.

The new mine is expected to produce about 2 million tons of ore annually which will be processed at the mine site into iron pellets when the mine will be in full operation, about 1963. It is estimated that the traffic from this development will approximate 100 cars of the processed pellets a day. The cars will move over this new Missouri Pacific track to the company's St. Louis-to-Texas mainline at Cadet, Mo. From there the pellets will go northward to an as yet undetermined point for shipment, probably by river barge, to eastern steel mills.

In view of this potential traffic, Missouri Pacific considered it a good investment to build the 28-mile line, and acquired 765 acres of land for the right-of-way. It had to be carved out of rugged terrain in this foot-hill country of the Missouri Ozarks.

Grading and drainage for the new track was done by outside contractors, with the work being divided in two sections. Section One, about 14 miles, was awarded to the J. A. Tobin Construction Co., of Kansas City, Mo. This part of the project called for common excavation of some 594,000 yards from cuts, and about 261,300

(Left) Heavy grading work was required for a 28-mile rail line through the foothills of the Ozarks. Track here has been ballasted. (Right) Crane lays one-half mile of track per day. Each rail is 39 feet long and weighs 1,456 pounds.

yards from borrow pits. Limestone rock from cuts totaled about 67,000 yards. This contractor began work in November 1958 and finished in April 1960.

Section Two, of about equal length, was built by Fruin-Colnon Contracting Co., St. Louis. Common excavation was an estimated 307,500 yards with borrow pits furnishing some 214,400 yards, but the rock excavation ran to about 111,000 yards. Work began on this section in April 1959 and was completed last June.

The two contractors built 18 bridges and trestles, including two highway grade separation structures. One was a 207-ft. long concrete and steel bridge to carry Missouri State Highway No. 21 over the track. The 16 concrete trestles ranged in height from 8 feet to 25 feet, the longest being 470 feet. All were concrete ballast deck structures.

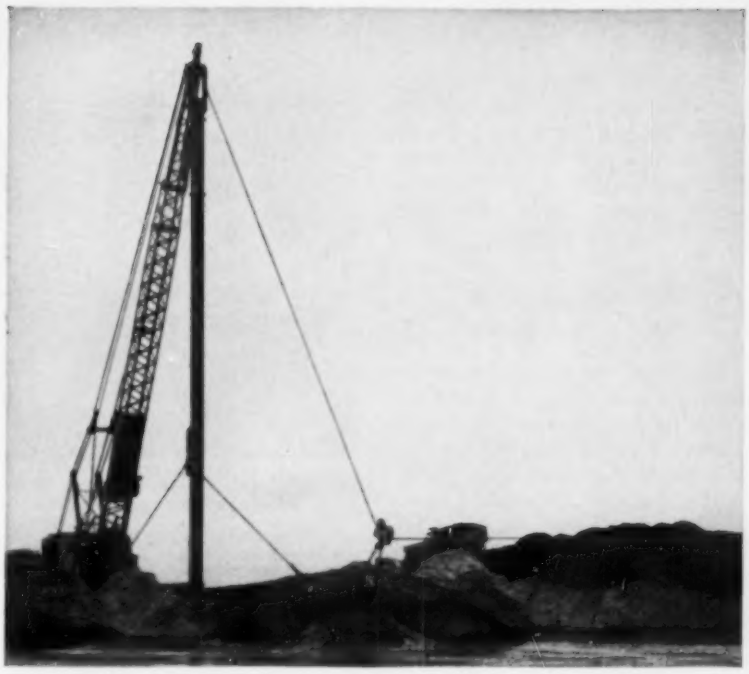
The railroad furnished the pre-cast concrete components for the bridges. The slabs, piles and posts were made in Missouri Pacific's concrete products yard at North Little Rock, Ark.

Corrugated metal culverts used in the project varied in size from 18 to 156 inches in diameter. The new track is standard gauge, and is substantially built. On completion of the embankment to construction sub-grade, it was trenched, and the material removed was used to build up the shoulder to final sub-grade. The trench was back-filled with select material which consisted primarily of sand and crushed gravel. After the track was laid on the select material, it was surfaced with a top ballast of chat.

The hilly terrain, which is in the region of Missouri Pacific's highest elevation of its mainline between St. Louis and the principal cities of Texas, dictated acceptance of some track curvature that would have been considered excessive for high-speed mainline track, but the maximum of six degrees is found only on one curve. Maximum grade in the direction of empty cars going to the mine is 2% compensated, and in the opposite direction, with loads from the mine, it is 1.5% compensated.

Even before the contractors' earthmoving machinery was completely out of the way, the railroad began hauling ties, rail and fastenings in its own trucks over the graded right-of-way. The rails and ties were laid out conveniently for the rail-laying gangs

Continued on page 50



Shoreline Reclamation by Crescent Scraper

Several million yards of sand and gravel are being used to extend the plant area of a Canadian steel company. Bottom-dump barges are used for the initial 20 ft. of fill. The additional 10 ft. below water and up to 15 ft. above lake level is built by redistributing the barge piles along the existing shore line.

The material is redistributed by a crane using a 5-yd. Crescent Scraper Bucket and carrier. On operating spans of up to 350 ft., the crane's hoisting line is used as a track cable. It is reeved through a block at the boom tip to a tail barge anchored offshore.

The barge swings on 200 ft. of anchor cable which permits a long period of crane operation before the anchor is shifted to a new location. The crane travels along the shore reclaiming material from a pie-shaped segment with the tail barge anchor as the vertex of the angle. The Crescent Bucket returns by gravity the full 350-ft. span. At average haul distances, it delivers 200 yd. per hr.

A Sauerman Crescent Scraper and carrier with a dragline crane is often the most economical solution to difficult excavating jobs. The normal reach of the dragline is greatly extended by using a track cable with a Crescent and carrier assembly. So equipped, its range is limited only by the spooling capacity of the drums.

Tubular mast supports 80 ft. boom on track cable setup. Tail barge in background. Load line is reeved through a Sauerman Fairlead on mast.

This arrangement has been used quite successfully for contract excavating jobs involving relatively small quantities of material. In many cases where unstable ground is encountered, the crane unit may be located on firm ground and the use of mats eliminated.

Find out how much you can extend the reach of your crane and increase its capacity. Write or call giving the make, model number and boom length of your machine. Field Report 231 and Catalog J. gives more information on Scraper operations with cranes.

SAUERMAN BROS., INC. 622 SO. 28th AVE. BELLWOOD, ILL.

Linden 4-4892 • Cable CABEX—Bellwood, Illinois

Crescent Scrapers • Slackline and Tautline Cableways • Durolite Blocks

Continued from page 49

that would follow. Then some 80 Mo Pac track workers put down the steel on the project. Track laying, which began April 1, was hindered by rainy weather, but by July 15, the job had been completed.

Giant Cement Kiln Shipped to Argentina

The largest wet process rotary cement kiln in the western hemisphere is now on its way from the port of Milwaukee to a South American cement producer, Loma Negra S. A., Barker, Argentina. Furnished by the International division of Allis-Chalmers Mfg. Co., as part of the cement company's $7.2 million expansion program, the equipment is being shipped aboard Moore-McCormack Lines' new 12,000-ton cargo ship *Mormacpride*, which is on her maiden voyage.

Measuring 610 feet long and 19 feet in diameter, the kiln will increase yearly cement production by 660,000 metric tons at the South American plant. Its capacity will be 48,000 sacks (each 94 pounds) per day. Loma Negra is the largest cement producer in South America.

Shipped in 59 sections, the kiln will be assembled upon arrival at Barker, a small town 250 miles south of Buenos Aires and 75 miles inland from the port of Necochea.

Port history is being made at the destination. To handle direct unloading of the 8-million pound cargo, it was necessary to dredge a new slip and build a spur for the railroad siding.

Design and manufacture of the equipment by Allis-Chalmers had to be made with an eye to the extremely difficult transportation problems involved. The new St. Lawrence Seaway, with its 27-ft. navigation depth, made possible shipment from a port on the Great Lakes. The old seaway system had only 14-ft. depths in its channels, canals and locks.

On her maiden voyage, the 12,000-ton *Mormacpride* is carrying a cement mill from Milwaukee to Argentina. The ship has special Seaway navigation equipment.

Moore-McCormack, which does not schedule regular sailings into the Great Lakes, got the water transportation job. Its brand new $10 million *Mormacpride* is one of the first U. S. flag ships designed with special Great Lakes features. The vessel has two longitudinal rubbing bars on each side to withstand narrow squeezes through the Seaway locks. It also has extra heavy capacity unloading booms to make up for the lack of crane capacity at the port of Necochea.

The *Mormacpride* is 483 feet long, of 12,000-ton capacity, has a beam of 68 feet, a fully loaded draft of 31 feet 5 inches. Neither the harbors nor the connecting channels of the Great Lakes could take her at full draft. The same was true at Necochea.

Moore-McCormack officials cooperated with Argentina officials to get the dockside depths at Necochea dredged and a rail spur built so that unloading could be directly into gondolas and onto flat cars. They also worked out a complicated roundabout rail route from Necochea to Barker to avoid certain tunnels and bridges.

Allis-Chalmers equipment furnished to the Barker plant includes crushers and grinders; electrical drive and control machinery; an HD-16 tractor shovel; and two fork lift trucks.

An important part of the mill is a large P&H bucket crane, made by the Harnischfeger Corp., Milwaukee.

The crane, whose girders are 118 feet long, has a lift capacity of 13 tons. It will be used to feed raw ma-

Largest in the Western Hemisphere, a wet process rotary cement kiln is on its way from the port of Milwaukee to a cement firm in Argentina. The 610-ft. long kiln is being shipped in 59 huge sections like the one below, which has a 19-ft. diameter.

terials to the kiln. The crane, with a 103-ton shipping weight, is the largest Harnischfeger has sent overseas.

Also included in the cargo is a large Bucyrus-Erie electric shovel which will work in the cement plant's quarry. The crawler-mounted 71-B loading shovel carries a 3-yd. dipper and operates through Ward Leonard electric control. Shipping weight is 107 tons.

Financing of the cement mill equipment was through a $5.9 million credit extended by the United States Export-Import Bank. Allis-Chalmers extended an additional credit of $1.3 million. The $7.2 million total includes transportation costs.

Schedule Drilling Symposium

A symposium on production drilling and blasting will be held Oct. 17-19 at Golden, Colo., sponsored by the mining departments of the University of Minnesota, Pennsylvania State University and the Colorado School of Mines.

The agenda includes papers which will be of interest both to the practical man in the field and to academic personnel.

The drilling symposia were originally started by the University of Minnesota back in 1950, and this is the third in a series of ten devoted specifically to production drilling and blasting.

The meeting is open to mining engineers, mine operators, drilling contractors and suppliers, and others interested in the subject matter. Complete details are available from the Colorado School of Mines at Golden.

Highway Contractors Census

A total of 11,300 contractors are currently eligible to bid on state highway and bridge construction contracts, according to Bertram D. Tallamy, federal highway administrator. Eighty-five percent of the total number are small business enterprises.

The information was compiled by the Bureau of Public Roads, U. S. Department of Commerce, from lists obtained from the highway departments of the 50 states, the District of Columbia, and Puerto Rico. These highway departments (which let contracts for interstate and other federal-aid construction work as well as for work financed with their own funds) each maintain listings of contracting organizations currently qualified, licensed or otherwise recognized as competent to bid on highway and bridge contracts.

HIGH AND DRY—When engineers sheared off the top of a hill in Tampin, Malaya to make room for a microwave radio relay station, they wisely avoided a mammoth boulder just below the surface of the original elevation. Today an antiquated wooden shack stands perched atop the stone in arresting contrast to the modern radio structure nearby. Standard Telephones and Cables Ltd., which is the London associate of the International Telephone and Telegraph Corp., made the Asian installation.

Included in the 11,300 total are contractors capable of performing all of the many varied operations of highway and bridge construction. Some are equipped to perform any type of work while others limit their activity to certain phases of construction such as grading, paving, drainage structures, bridges and small specialty items.

The great majority—9,590 or 85% —are eligible to bid in only one state and may be classed as small businesses. Another 919 contractors, or 8% of the total, are eligible to bid in two states; in many cases they represent small businesses favorably located with respect to two adjacent states and thus able to bid in both. An additional 330 contractors, or 3% of the total, are eligible to bid in three states.

The remaining 461 contractors, representing 4% of the 11,300 total, are active in more than three states. On the average, each of them is eligible to bid in seven states. This group generally encompasses the largest, as well as the most widely operating, organizations in the highway and bridge contracting industry.

The number of contractors actively engaged in highway and bridge construction is in a constant state of change because of new business starts, mergers, shifting of activity to and from other related construction fields, and failures and voluntary retirements. The present count, however, is an accurate gage of the contractor potential for the federal-aid and state highway construction programs now under way.

6
G

WORK AWAY...

WORRY-FREE

...NO ROLLER GREASING EVER!

The 72-hp Allis-Chalmers HD-6G is the only 1½-yd tractor shovel with permanently lubricated tapered roller bearing truck wheels, idlers, support rollers—gives you certified protection . . . saves greasing time, materials and money.

The PERMA-SAFE truck wheels, idlers and support rollers in the HD-6G are lubricated at the factory . . . need no further greasing regardless of conditions. PERMA-SAFE design with Positive Seals and tapered roller bearings keep lubricants in . . . dirt and moisture out . . . *for life.*

In addition to timesaving, care-free track lube, the HD-6G also features super pry-out action, highest dumping clearance, fastest reverse and many more big tractor shovel advantages.

Your Allis-Chalmers construction machinery dealer will be glad to put an HD-6G through its paces on your toughest job. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

move ahead with

ALLIS-CHALMERS

...power for a growing world

Equipment You Ought to Know About

Two-Axle End-Dump

Manufacturer: KW-Dart Truck Co., Department EE, Kansas City, Mo.

Claims: A 40-ton capacity end-dump truck has been introduced by Dart. The model 40SL vehicle is reported to be the largest two-axle dump truck ever placed into service.

Shown here is one of four model 40SL's currently hauling iron ore on the upper Michigan iron range.

The giant ore movers are 30 feet long, 13 feet high and 12 feet wide. They are powered by a V-12 diesel engine coupled with a four-speed transmission-converter. Tires are 18.00 x 33.

Hydraulic Boom Transit Crane

Manufacturer: Bucyrus-Erie Co., Department EE, South Milwaukee, Wis.

Claims: Bucyrus-Erie's 11-B carrier-mounted crane-excavator is now available with hydraulically-operated telescopic boom that offers extra reach and control for precision crane work. The new 11-BH Series Two Transit Machine is rated as a 12-ton crane. It can be equipped for clamshell or dragline service and adapted to other attachments.

Most significant feature is a three-piece telescopic boom with hydraulic control. Minimum boom length for compact road travel or congested indoor operation is 25 feet. A 12-ft. telescoping upper section provides 25 to 37-ft. short boom flexibility or, with intermediate section manually extended and pinned in place, a 38 to 50-ft. boom. An optional 10-ft. section can be added to the lower boom section for extra reach up to 60 feet. Jibs are available in 10 or 20-ft. lengths.

Also optional and recommended for lifting crane service are hydraulic outriggers and power controlled lowering boom hoist. With an additional hydraulic control valve, a hydraulic ½-yd. clamshell bucket or a ¾-yd. materials handling bucket can be used. A conventional 2-rope clamshell can also be used since the 11-BH has two rope drums. Equipped with a fairlead, the machine will handle the same size dragline bucket as recommended for the 11-B Transit Dragline.

Hydraulic power is supplied by a

hydraulic pump driven directly by the engine through a flexible coupling. Hydraulic control valves are located in the upper works cab directly ahead of 11-B main operating controls. The 11-BH with hydraulic boom can be converted in the field to conventional front ends.

Elevating Scraper

Manufacturer: LeTourneau-Westinghouse Co., Department EE, 2301 N. E. Adams St., Peoria, Ill.

Claims: A 10-yd. self-loading tractor-scraper combination, designated

model 10E2, is being introduced by LeTourneau-Westinghouse and the Hancock Mfg. Co., Lubbock, Tex.

Built for jobs where self-loading is mandatory, the Hancock elevating scraper, will load in short time under moderately difficult conditions, because of the chopping action of the slat-type elevator. This elevator, driven by L-W motors, chops and pulverizes the material and carries it rapidly off the scraper blade high into the bowl, to give high dirt-moving capacity. The soil-pulverizing action makes spreading easy and uniform and eliminates the need for a separate finishing tool.

Smallest of the L-W Tournapulls, the "D" is a fast, powerful machine teamed to the model 10E2 scraper which was built as a part of this combination. The model D 'Pull, with its 143-hp GM 4-71 engine is capable of haul road speeds up to 30 mph.

1¼-Yd. Wheel Traxcavator

Manufacturer: Caterpillar Tractor Co., Department EE, Peoria, Ill.

Claims: The third model in Caterpillar's line of wheel Traxcavators to be introduced this work season—the 80 net horsepower 922—is now available.

In overall design and configuration, the 922 closely resembles the two larger machines previously announced, the 105-hp 944 and the 140-hp 966. The 922 has a 1¼-cu. yd. capacity bucket, and is powered by either a gasoline or diesel engine.

A prime feature of the wheel Traxcavator design like its two "brothers," is the open and easily accessible operator's compartment and the location of all loader mechanism completely ahead of the operator's compartment.

With a maximum lift capacity of 12 feet 2 inches, and a dumping reach of 25¾ inches, the 922 has a breakout force of 13,700 pounds. Turning radius at the outside rear tire is 20 feet 4 inches. Ground clearance is 14⅜ inches.

The D320 diesel engine powering the 922 has four cylinders and a 4 x 5 bore and stroke. For comparative purposes, maximum rating of this engine is 105 horsepower. The gasoline engine has six cylinders and a 4 x 4⅜-in. bore and stroke, and starts with a 12-volt direct electric system. A 24-volt system is standard for the diesel engine, with a gasoline starting engine as optional equipment.

Power train of the 922 includes a two-speed power shift transmission, a torque converter, auxiliary transmission and a planetary final drive. Four wheel drive is used for working conditions and a two wheel drive is available for roading. A high-low speed range gives the wheel Traxcavator four speeds forward and four in reverse.

Controls are positioned for ease of operation during all phases of the work cycle. The forward-reverse lever is mounted on the left of the steering column. The high-low speed selector and the two wheel-four wheel drive selector are both located to the left alongside the operator's seat. Bucket controls are to the right of the operator and a hydraulically actuated bucket positioner is standard.

The 922 has three brake controls. The left brake pedal not only acts to stop the machine, but also automatically shifts the transmission into neutral. The right pedal is not connected with the transmission, however, and serves only as a brake. A parking brake locks the transmission output shaft and automatically shifts the forward-reverse lever into neutral.

With a gross weight of 15,920 pounds, the 922 is 16 feet 5 inches in length and is 6 feet 11¾ inches

Continued on page 56

CUTTING CAPACITIES UP TO 1 INCH 1-1/16 INCH, AND 1-1/2 INCH.

THE
Morse-Starrett
WIRE ROPE CUTTER

FAST
Especially designed cutting blade and dies of the finest steel assure fast cutting action.

EASY
Anyone can operate it. The hammer principle eliminates any special skill requirements.

SAFE
The enclosed cutting blade locked in the body of the cutter assures perfect safety.

PORTABLE
Models for tool kit or stationary operation. Made in three sizes.

SEE YOUR DEALER OR WRITE TO
MORSE-STARRETT PRODUCTS CO.
1204-49th AVENUE • OAKLAND 1, CALIF.

New Equipment . . .

Continued from page 55

wide at the bucket. Standard tire sizes are 12-ply 12:00 x 24 and optional are 12-ply 13:00 x 25. The 922 Traxcavator has a top speed of 19 mph forward and 24 mph in reverse.

Low Bed Trailer

Manufacturer: LaCrosse Trailer Corp., Department EE, 418 Gould St., Box 857, LaCrosse, Wis.

Claims: LaCrosse has announced a 3-axle heavy-duty low-bed trailer with single-point suspension design. The new model DF3T assures equal load distribution on each axle regardless of where the load is placed on the trailer bed. This design meets regulations in states that provide advantages for 3-axle loads.

Three sizes—30-ton, 40-ton and 50 ton—are available with either 15 or 20-in. wheels for maximum long haul service. All are available with drop or flat platforms.

The three-axle design incorporates LaCrosse's heavy-duty thru-axle tandem assembly. This assembly is coupled to the third axle by a walking beam.

Constructed of T-1 steel, the beam provides the connection between the single forward axle and the rear tandem assembly with single-point suspension from the trailer frame. Two-way oscillation provides uniform distribution of weight even when single wheels are raised or lowered by uneven ground.

Positive alignment of the entire 3-axle unit is assured by an independent stabilizer bar attached to the forward or third axle preventing excessive tire wear. High pressure oilite and rubber bushings are used throughout the assembly to insure the long life and alignment.

Air-Controlled Excavator

Manufacturer: American Hoist & Derrick Co., Department EE, 63 S. Robert St., St. Paul, Minn.

Claims: A completely new air-controlled crane-excavator in the 3½ to 4½-cu. yd. size has been announced by American. The machine, when rigged as a lifting crane, has a rated capacity of 110 tons. Several types of booms are available—the erecting type has an operating length of 270 feet, plus jib. All booms are alloy steel with tubular lattice construction and with pin-connecting sections.

The 3½-yd. single-stick rope crowd shovel features a high location of the shipper shaft, giving excellent floor clean-up area and reach. The hoe is available in either 55 or 65-in. bare bucket cutting width.

Heavy traction chains mounted outside the crawler side-frames are easily accessible and arranged to stay completely inside the tread shoes for protection against rocks, sand and other debris. This feature also permits removal of the side-frames without breaking the traction chain. Side-frames can be removed easily and quickly by the removal of one large bolt at the end of each axle.

The 900 Series model has a full 18-in. ground clearance. Tread shoes are cast steel, double wall construction in 38 and 44-in. widths.

The machinery deck features tapered deep girder construction extending straight through from the boom foot to the counterweight support. It is nearly four feet thick at the center and is jig-bored, drilled and machined, for alignment of shafts, gears, bearings and drums.

Independent swing is available with either air-controlled friction clutches or hydrostatic drive. The boom hoist features a sprag-type overrunning lowering clutch.

The operator's compartment is totally enclosed, reducing to a minimum engine and machinery noise. Access to the machinery is through a door at the rear of the operator's compartment.

The 900 can be furnished with either General Motors, Cummins, Caterpillar or Allis-Chalmers diesel engines with various torque converters or direct drive.

VHF Pocket Receiver

Manufacturer: Communications & Industrial Electronics Div., Motorola, Inc., Department EE, 4501 W. Augusta Blvd., Chicago 51, Ill.

Claims: A high powered, fully transistorized VHF pocket receiver provides reliable voice communications even in noisy locations.

The "Handie-Talkie" receiver provides 500 milliwatts audio output, five times the power of previous units. It is available for operation in the 25-54 megacycle and the 144-174 megacycle frequency bands—the standard two-way mobile radio channels.

The small receiver, weighing just

over 10 ounces, can be worn in a pocket or clipped to the belt. Both volume and squelch can be controlled externally.

The Motorola unit operates from either a rechargeable battery or from mercury cells. The rechargeable nickel cadmium supply provides up to 12½ hours operation with each charge. The replaceable mercury cells last up to 125 working hours.

Included in the new unit is a built-in antenna. A jack also provides connection for an external antenna to

Continued on page 60

JS-30'S SHIFTING WHEEL LICKS SNUG TRENCH JOB

THE CLEVELAND JS-30 TRENCHER, with instant lateral shifting and power tilting of its digging wheel, got high daily trench production on a utility job where trench had to be dug in a road shoulder hemmed in by poles, trees and heavy growth on side slopes rising sharply within six feet of the pavement's edge.

Crawlers were steered as necessary to sneak by obstructions, while the JS-30's digging wheel was power-shifted laterally, keeping trench digging right on line. Power-tilting of its digging wheel allowed the JS-30 to dig straight vertical trench with one track higher than the other on the side slopes, without blocking or cribbing.

THE JS-30—A TRENCHER OF AMAZING UTILITY

- Digging wheel power-shifts 5' from side to side
- Digs trench flush with parallel pavement, curbs, etc.
- Digs trench virtually flush with trees, poles, fences, etc.
- Digs vertical trench on side slopes, cuts blocking, cribbing
- Excavates bell holes, saves on trench width
- Digs 11"-24" wide, to 5½' deep; digs to 6' wide with power-shifting of wheel
- 100% control of all operations at operator seat.

Get the complete story on the JS-30 from your distributor

The CLEVELAND TRENCHER Co.

20100 ST. CLAIR AVE. • CLEVELAND 17, OHIO

Good Everywhere ®

NOT in the Contract

An old man had a set of monkey glands installed in his system and shortly thereafter was married. In due time his wife came to labor, and the good old man waited outside the door. When the doctor opened the door, he besieged him: "What is it? A boy or a girl?"

"Don't be so impatient," the doctor urged. "Wait 'til it comes down off the chandelier and I'll tell you."

Two Boston ladies were sightseeing in California on a very warm day.

"It never gets like this in Boston," remarked one, fanning herself rapidly.

"Of course not," returned the other. "But you have to remember that here we are 3,000 miles from the ocean."

Blondie: "I enjoyed the opera last night with Bill; he has the most powerful binoculars."

Brunettie: "I'd love to meet him. I just love those strong virile men."

Since the new dozer operator couldn't stop snapping his fingers, he went to see a psychiatrist.

"Why do you do this?" asked the doctor.

"It keeps the tigers away, Doc."

"My good man," replied the psychiatrist, "there are no tigers within 6,000 miles."

"Effective, isn't it?" he beamed.

Jimmy was assigned by his teacher to write a composition about his origin. He questioned his mother.

"Mom, where did Grandma come from?"

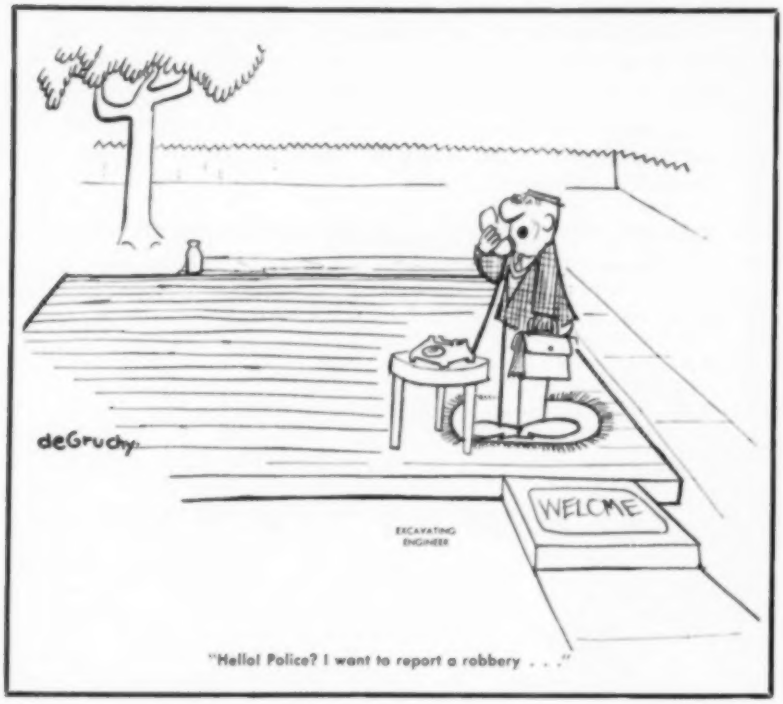
"The stork brought her."

"Well, where did you come from?"

"The stork brought me, and you too."

So the small modern wrote as the introduction to his composition: "There have been no natural births in our family for three generations."

Sign on the back of a small foreign car: "Quit honking. I'm pedaling as fast as I can."



"Hello! Police? I want to report a robbery . . ."

A mousy little man was frightened silly of his boss. One day he told a fellow worker he was sick. His friend suggested he go home.

"Oh, I couldn't do that."

"Why not?"

"The boss would fire me."

"Don't be silly. He'll never know. He's not even here today."

Finally the man was convinced and went home. When he got there, he looked in the window and saw his boss kissing his wife. So he ran all the way back to the office.

"A fine friend you are!" he said to his co-worker. "I nearly got caught!"

"Congratulations, my boy! You will always look upon this as the happiest day of your life."

"But I'm not getting married until tomorrow."

"Yes, I know."

Junkman: "Any rags, paper, old iron?"

Man: "No, my wife is away from home."

Junkman: "Any bottles?"

An Indian with young ideas managed to swap his 40-year old squaw for two 20-year old maidens at the annual tribal powwow.

The next year he returned and asked for his former wife back.

"Me not wired for two 20," he explained.

The classified ad offered a dog for sale: "Grown boxer. Will eat anything. Especially fond of children."

A man had a small farm down there with just a few sheep and one day his wife, while dyeing some bedspreads blue, had a little lamb fall into the bucket of dye. A passing motorist spying the lamb with the blue fleece stopped and offered $50 for it. So the Texan figured he had stumbled onto a good thing and colored more of his lambs with blue dye which brought him big profits.

"Pretty soon," he recalled, "I was coloring my lambs pink, blue, yellow, green, lavender and turquoise. And you know—now I'm the biggest lamb dyer in Texas."

WORKING IN MUD...

DW21s push tough excavation job

Put yourself in the shoes of Grantwood Construction Co., Kirkwood, Missouri. The job—excavate 425,000 cu. yd. for the River Roads Shopping Center, St. Louis. Average haul distance—900-ft. round trip.

Here's the dark side of the picture. Bad weather turned the silt and clay into heavy, slippery muck. And the rains continued, throughout the spring.

Adverse conditions? Definitely! But the two DW21Gs took them in stride, moving big loads over soft ground.

Three features on the DW21G paid off big:

SYNCHROTOUCH TRANSMISSION CONTROL: It lets the operator shift simply by dialing the desired gear for automatic, split-second response. Result: faster shifting, faster cycles, more payloads per hour, less operator fatigue for higher daily production.

POWER: DW21G is rated at 345 HP (maximum output) . . . plenty of power to get heavy loads out of the cut . . . hustle them over soggy ground.

GOOD FLOTATION: Wide-base tires on tractor and matching 470B Scraper carry big loads over ground that bogs down other rigs. 470B is rated at 19.5 cu. yd. struck . . . 27 cu. yd. heaped. Other features add up to lower maintenance cost; longer, more productive service. For example, strong bowl, draft frame and apron shrug off the punishment of heavy loads.

The DW21G delivers top performance on any job . . . especially the tough ones. Your Caterpillar Dealer has complete details on this versatile scraper combination. Ask him to demonstrate its profit potential on your job.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

CATERPILLAR

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WANTED--
THE HARD WORK

Don't spoil it. KROIL it!

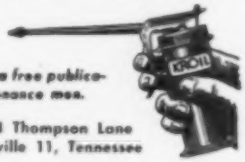
Don't ruin a valuable piece of equipment merely because some part is rusted tight. Apply *KROIL*, the amazing new chemical lubricant that creeps into millionth inch spaces (proved by laboratory tests), **dissolves rust, supplies necessary lubrication and . . .**

Loosens Frozen Parts

18,000 of America's leading plants can't be wrong. They have used KROIL for ten years and depend on it to save expensive labor and valuable parts. They say: "Kroil loosened bushings after a 12-ton press had failed" . . . "on repairing heat treat trolleys formerly destroyed every nut. Now Kroil saves them all, and time, too."

You too can get these results. Try KROIL on money-back basis.

Gallon, $4.35; with Kroiler squirt gun, $5.25, f. o. b. factory.



Ask for GENIUS AT WORK—a free publication full of ideas for maintenance men.

KANO LABS. 1083 Thompson Lane Nashville 11, Tennessee

New Equipment . . .

Continued from page 57

effectively extend the normal communications range. A trouser-leg antenna is available for receivers operating in both low and high band frequencies. There is also a helmet mounting type antenna for operation in high band frequencies.

14-Yd. Twin-Power Scraper

Manufacturer: Euclid Div., General Motors Corp., Department EE, Cleveland 17, Ohio.

Claims: Euclid has announced a twin-power 14-yd. scraper with a 20-yd. heaped S.A.E. rating at 1 on 1 slope. Designated model TS-14, this all-wheel drive scraper is powered by two GM 4-71 engines, each with a separate Allison Torqmatic drive consisting of torque converter and 4-speed semi-automatic transmission.

Converter lock-up in each Torqmatic drive gives maximum fuel economy through efficient use of the 296 total engine horsepower on grades and long, high-speed hauls. Air assist remote control and full power shift enables operator to change from one speed range to another by a simple move of the selector lever. No-Spin differential is standard in both drive axles. Tires are 24.00x25. Two hydraulic jacks provide full 90° steering.

All scraper operations—bowl, apron and ejector—are hydraulically and independently controlled. The ejector is of the positive roll out type actuated by a hydraulic jack that is identical to the apron jack. Two interchangeable bowl jacks are connected to the scraper bowl through heavy duty levers and linkage. Cutting edge consists of four adjustable sections that are identical and reversible.

The twin-power scraper can self-load and work under the most adverse conditions. All-wheel drive gives this scraper a wide range of usefulness for small yardage jobs such as secondary road construction, soil conservation, stripping and industrial grading as well as for medium and big, high speed, high production earthmoving projects.

Tire Inflation Device

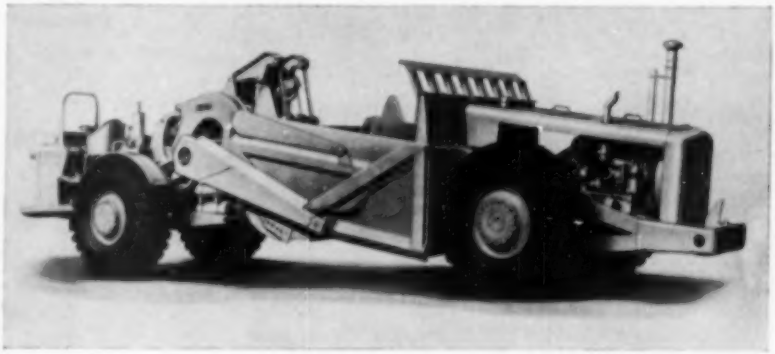
Manufacturer: Bros, Inc., Department EE, 1057 10th Ave., S.E., Minneapolis 14, Minn.

Claims: The Bros SP-730B self-propelled pneumatic tire roller is now available with an "on-the-run" tire inflation device that allows the roller operator to increase and decrease tire pressures quickly during rolling operations. The inflation device can be installed on all SP-730 models in the field with a modification kit.

This feature eliminates stops for changing ballast for "stage" compaction of weak or wet subgrade materials. With the "stage" method, the roller will build bearing strength with low tire pressures and densities with increased tire pressures without ballast changing.

At the low tire pressures, contact areas of tires are substantially greater under full ballast loads providing maximum area for roller support in low bearing strength soils. For compacting asphalt surfaces, the initial or breakdown pass on hot asphaltic materials can now be made at low tire pressures to set the material. Maximum densities can be produced by increasing tire pressures.

Inflation kit includes compressor, gauges, control stand, air seals, air line and protection covers to each tire.



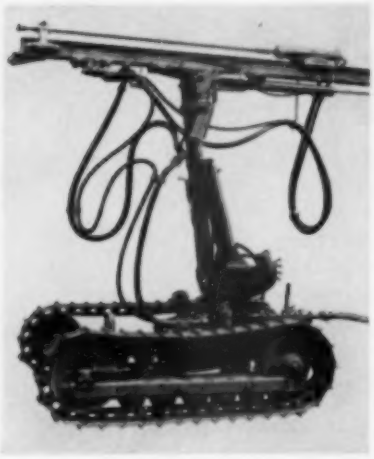
Crawler Drill

Manufacturer: Chicago Pneumatic Tool Co., Department EE, 6 E. 44th St., New York 17, N. Y.

Claims: Chicago Pneumatic's G-900 Tracdril is a one-man operated mechanized drilling rig capable of drilling over either track at right angles. The G-900 can cover a 17-ft. diameter 180° arc.

Capable of drilling horizontal snake-holes a scant 25 inches from the ground, the Tracdril's boom can be raised to a height of 11 feet for horizontal breast-holes.

A 12-hp tramming team, powerful enough to tow a 600-cfm compressor up a tough 20% grade, provides the driving force for the G-900. Specially constructed Oliver crawlers furnish 1,350 square inches of ground contact. Five lower track wheels, manganese steel pads and 10-in. wide tracks maximize stability. When the tramming throttle is released, "dead man" controls snap back to neutral while automatic brakes instantly lock the tracks positively in place. Throw-out clutches disengage tramming motors for towing, eliminating motor burn-outs.



The Tracdril spots quickly, effortlessly. All drilling maneuvers—swing, lift, dump and tilt—are hydraulically controlled. Dual controls—one set on forward end of the drill boom, the other at the tramming position—provide the operator with control of every rig maneuver from front to rear, saving steps.

The G-900 mounts the 4 or 4½-in. Deep-Hole drill. Featuring built-in forward-reverse-neutral rotation, the Deep-Hole drill works in or out of hole fast. It uses sectional steel rods.

SIDE DUMPS for ROCK, EARTH, ORE

PAN ▸ TYPE truck bodies and trailers 14 to 45 TONS dumped by EASTON electric overhead hoist

◂ DROP DOOR truck bodies and trailers 14 to 40 TONS dumped by integral hydraulic body hoists

SIDE DUMP ▸ TRAINS pan type and drop door capacities unlimited

Variable Wheel Base ◂ REAR DUMPS capacities 22 and 35 TONS

★★★★★★★★★

EASTON CAR & CONSTRUCTION COMPANY • EASTON, PA.

★★★★★★★★★

WRITE FOR CATALOG A

B-1084

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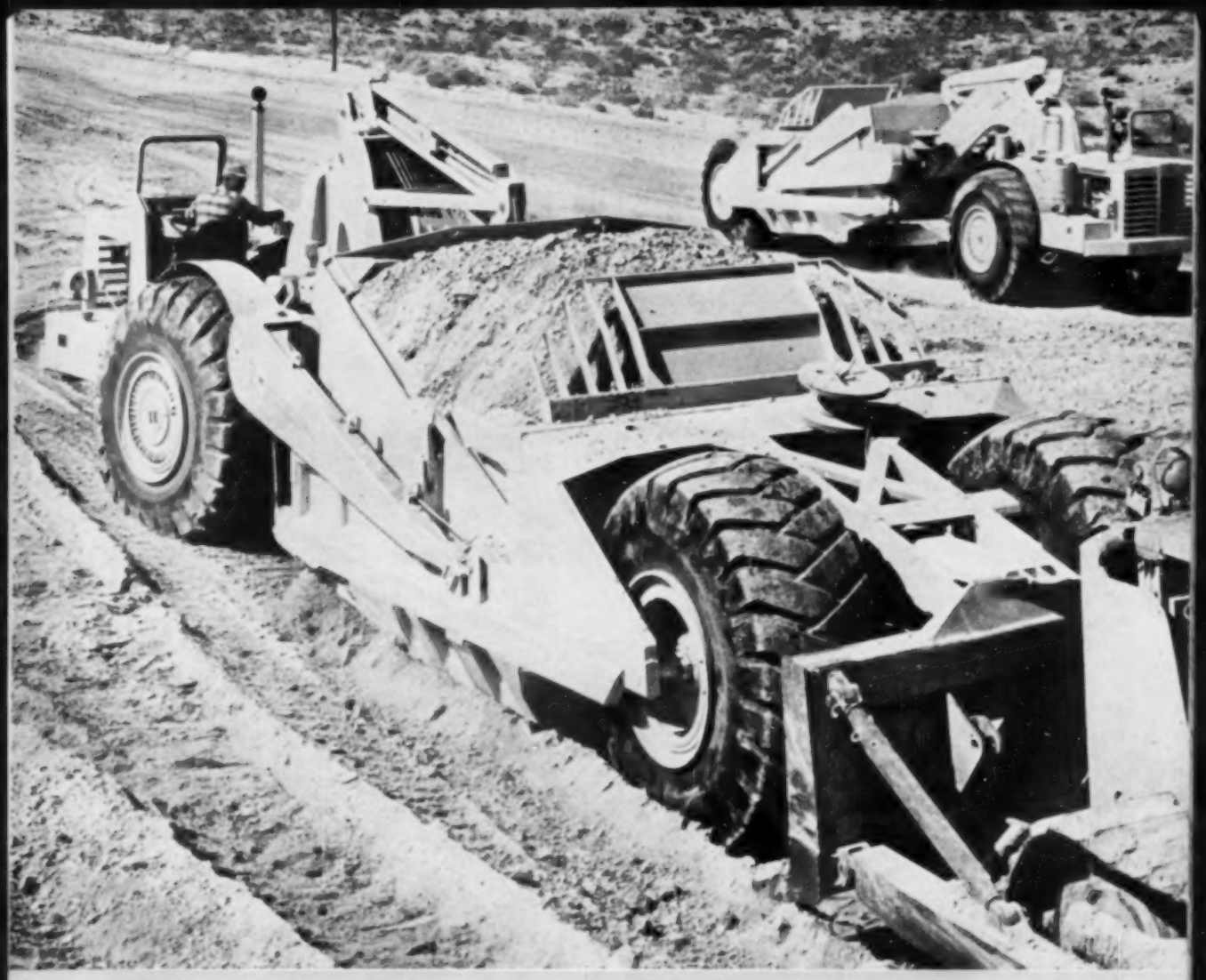


With the planet-powered 230-hp TD-25 pushing—and with 375 high-torque International Diesel hp under the "295's" hood—you heap on 34-cu. yd. with amazing new speed. Even in toughest loading conditions, "X"-member reinforcing maintains perfect Payscraper push-frame alignment!

Note that the Payscraper apron lifts to a big 94-inch opening. Two ejector-plate pushing members apply dozer-like action to force out the whole 34-cu. yd. load cleanly. The 122-inch bowl width speeds unloading, and loading, too—adds control ease and stability, loaded or empty.

How Payscraper* power and power controls boost your dirt-on-fill delivery!

You get highest power-to-payload punch of all rubber-tired rigs in the 34-cu. yd. International 295 Payscraper. The fast-slugging, high-torque 6-cylinder International DT-817 Diesel is the Payscraper power plant.

The direct-start, 375-hp DT-817 is turbocharged to give you all-altitude, high-efficiency performance—power for cycle-speeding rim-pull—plus time-saving "no-lag" control power!

You power-shift the Payscraper, up or down—and the 4-speed planetary-type, torque-converter transmission provides load-speeding *automatic* direct-drive lock-ups in second, third, and fourth gears!

You power-steer the 150,000-lb. loaded Payscraper almost as easily as a 3,600-lb. automobile. Payscraper gives you the big control advantages of (1), exclusive International rack-and-pinion plus tandem pump steering system; and (2), 3-degree forward spindle pitch that improves scraper balance and prevents "nose-downs" in high-speed turns!

You power-control Payscraper dirt-handling actions with fingertip ease with the International PTO-driven Cable Control Unit. One cable drum of this simple planetary system actuates the apron and ejector; the other drum positions the bowl to control loading and spreading! Reach-easy Payscraper power brakes give you fast, positive stopping!

Ease into the bump-smothering Payscraper seat—press the direct-start button—power-shift the outfit into action. Compare the speed of loading, roading, and dumping the 122-inch bowl. See how the advantages of DT-817 Diesel power and complete, positive Payscraper power control can boost your dirt-on-fill delivery. Choose the 2-axle "295," or 3-axle, 34-cu. yd. "495." See your International Construction Equipment Distributor for a demonstration!

Here's your 76-page cost and production estimating book—newest, most authentic and complete guide for estimating material-moving costs—and for selecting equipment combination for top profits, *anywhere!* See your International Construction Equipment Distributor!

International® Construction Equipment

International Harvester Co.,
180 North Michigan Ave., Chicago 1, Ill.

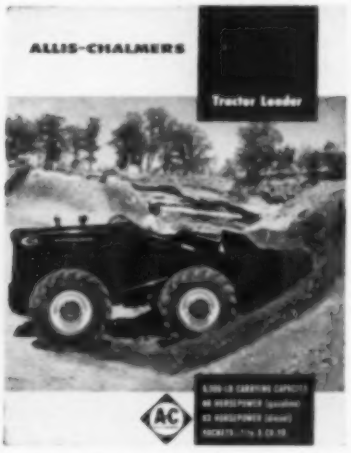
A COMPLETE POWER PACKAGE

Positive power-control of all operations adds safety, builds operator confidence — makes him "haul-speed minded" to help you get full capacity and profit from Payscraper speeds up to 33.5 mph. For example, safe, effortless tandem-pump power-steering leaves "the steering feel in the steering wheel"—gives positive, one-hand control!

NEW Trade Literature

Subject: **Front-End Loaders**

Content: Two A-C literature items have been released by the Construction Machinery Div. One piece, MS-1373, features the TL-14



tractor loader. The 8-page catalog contains information on the two transmissions available for the 83-hp unit, a bucket selection chart and complete specifications. The other piece, MS-1386, is a spec sheet covering the recently introduced TL-12 tractor loader, which is a 4,000-lb. carry-capacity unit available with 1 to 2-yd. buckets.

Where to get: Allis-Chalmers Mfg. Co., Construction Machinery Div., Department EE, Milwaukee 1, Wis.

Subject: **Granulated Slag**

Content: A new four-color booklet, entitled *USS Granulated Blast Furnace Slag*, describes how this type of slag is used in the manufacture of cement, construction of highways, agriculture, concrete masonry units, landscaping and general construction. The wide use of blast furnace slag is evidenced by the ever-increasing applications of the 40 million tons produced annually. The free booklet explains the advantages of using granulated slag as a subbase in highway and general construction.

Where to get: U. S. Steel Corp., Department EE, Room 2801, 525 William Penn Pl., Pittsburgh 30, Pa.

Subject: **Hardsurfacing**

Content: Basic information is contained in a 12-page Lincoln Electric bulletin, called *Manual Hardsurfacing*. The bulletin discusses the economics and metallurgy of hardsurfacing, analyzes the various conditions which demand surfacing, and provides information concerning electrode selection and procedures which will produce the type of surfacing desired. Ask for bulletin 3100.1.

Where to get: Lincoln Electric Co., Department EE, Cleveland 17, Ohio.

Subject: **¾-Yd. Excavator**

Content: A 20-page catalog gives details of the ¾-yd. crawler-mounted Lorain model 26. Construction and job applications for use as shovel, crane, clamshell, dragline, hoe, log loader, pile driver and magnet are described. The book is produced in two colors, and contains photographs of component parts and field pictures of machines in action. Ask for bulletin 26751-0.

Where to get: Thew Shovel Co., Department EE, Lorain, Ohio.

Subject: **Centrifugal Pumps**

Content: A 4-page bulletin describes the Rice line of self-priming industrial pumps, suitable for water and petroleum. Models from 1½ thru 10-in. sizes, offer both high head and high volume capacity. Large pump bodies enable fast cool automatic priming. The pumps feature Timken tapered roller bearings and hardened steel wear plates. The cartridge-type shaft seal is sleeve mounted and automatically adjusts itself for wear. A renewable sleeve protects the pump shaft. The suction check valve is built in. Units are available for belt drive or direct flexible coupling. Ask for bulletin CPE 1-27.

Where to get: Rice Pump & Machine Co., Department EE, Belgium, Wis.

Subject: **Diesel Engines**

Content: A 28-page Caterpillar booklet is designed as a handbook for engine purchasers. Titled *Judging Engine Quality*, it emphasizes the features of various designs which provide top performance for minimum cost—original and/or final. It discusses in detail: design, material and workmanship; reliability; cost of operation; parts and service availability; trade-in or resale value. Vivid cutaway illustrations compare four and two cycle operation; multiple and single orifice injection valves; precombustion chamber and direct injection of fuels; and other important items involved with selection of engine power. Ask for Form 20185-DN935.

Where to get: Caterpillar Engine Div., Department EE, Caterpillar Tractor Co., Peoria, Ill.

Subject: **Eimco Loader**

Content: A comprehensive 32-page booklet covers the recently introduced 100-hp diesel Eimco 103 crawler-tractor line. A full-color photograph on the cover shows an Eimco 103 bulldozer in action. Inside pages are illustrated with features of this tractor series—its power train; the unitized "stress flow" construction; self-cleaning air cleaner; hydraulic track take-up; increased ground clearance; and full track oscillation. Full specifications on the tractor, bulldozers, front-end loaders and log loader units in this series are included. Ask for bulletin L-1097.

Where to get: Eimco Corp., Department EE, P. O. Box 300, Salt Lake City, 10, Utah.

Subject: **Test Equipment**

Content: Soiltest's engineering equipment catalog contains 316 pages and describes over 3,400 items ranging from a small, pocket-sized soil penetrometer to completely equipped mobile laboratories. Featuring approximately 1,500 illustrations, the catalog has sections on equipment for testing soils, concrete, aggregate and bituminous materials; mobile laboratories; general laboratory equipment; and drilling and sampling equipment. Listings include major equipment

and all accessory items. Referenced to ASTM and AASHO specifications, the publication contains recommended equipment lists for specific types of testing projects.

Where to get: Soiltest Inc., Department EE, 4711 W. North Ave., Chicago 39, Ill.

Subject: **Low-Bed Trailers**

Content: Three types of models in the Rogers line of heavy-duty low-bed trailers are detailed in a trio of 4-page bulletins. The first of the series covers the Custom T models in 15 through 40-ton capacity; the second features TVT models in 15, 25 and 35-ton capacities; the last describes THPG "Hydrau-lift" detachable gooseneck trailers in 25 to 75-ton models.

Where to get: Rogers dealers or Rogers Brothers Corp., Department EE, Albion, Pa.

New Movies . . .

Subject: **National Highway Program**

Content: The Associated General Contractors of America offers a 28-minute 16mm sound film of a panel discussion of *The Highway Program: Today and Tomorrow* by five leading authorities on highways. It deals with highway needs and benefits, construction costs, financing, and the current Congressional investigation of the program. Participants in the discussion were: John A. Volpe, president of the AGC and former federal highway administrator, the moderator; Congressman Gordon H. Scherer of Ohio, ranking minority member of the House subcommittee on roads; Federal Highway Administrator Bertram D. Tallamy; A. E. Johnson, executive secretary of the American Association of State Highway Officials; and State Senator Randolph Collier of California. The filmed panel discussion took place at the AGC's 1960 convention in San Francisco. It will be made available for showings to civic or other public groups.

Where to get: Associated General Contractors of America, Department EE, 1957 E St., N. W., Washington 6, D. C., or AGC chapters.

Marion Long-Life Hopper Trailers

FOR FAST, LOW-COST HANDLING OF COAL, AGGREGATE, ORE

Look at the performance-proven facts!

• SAVES TIME when dumping—you get more round trips which means more payloads. • MINIMUM MAINTENANCE—there's little to get out of order. • RUGGEDLY BUILT to withstand severe usage. • SINGLE AND TANDEM AXLE units for highway use according to state road law. FOR OFF-HIGHWAY use in coal, aggregates, ore. • CAPACITIES—10 to 100 cubic yards. • CENTER PARTITION available to provide two compartments for better load distribution and extra side support. • DOUBLE OR SINGLE sets of doors lengthwise or cross doors for dumping and spreading. • IDEAL FOR CONTROLLED SPREADING of aggregate on road jobs with power operated or manual door opening. • EACH HOPPER is job engineered to fit your operation and the material to be hauled. Your nearby Marion Distributor will be glad to give you full details on Marion Hoppers best suited to your operation. Marion makes a complete line of hydraulic hoists and dump bodies.

MARION METAL PRODUCTS CO.
Marion, Ohio, U.S.A.

BONDED
BUY
NOW AT YOUR CATERPILLAR DEALER...
Big Bargains
IN USED EQUIPMENT!
Do you need extra equipment to finish that job before bad weather sets in? See your Caterpillar Dealer! He has the biggest selection of top values in town . . . nearly all makes, all sizes, all models, all conditions . . . priced to sell with financing tailored to meet your needs!
No guessing or gambling on your part. Your Caterpillar Dealer reconditions, classifies and warrants most of his used units. You know what you're getting . . . and you're protected . . . with these three types of buys:
1 A "BONDED BUY" Cat-built machine, the most productive used equipment you can buy. Carefully checked, it is backed by his written bond up to $10,000, assuring you parts and service protection for the warranty period.
2 A "CERTIFIED BUY"—a written warranty covering units of any make in good condition.
3 A "BUY AND TRY" deal—a written money-back agreement on machines not in the above two classifications.
Only a Caterpillar Dealer will provide you with "Bonded Buy" protection. He backs his machines with prompt service and parts you can trust. Look him up in the Yellow Pages . . . look over the machines in his used equipment lot. You'll find the best buys in the market there!
Caterpillar Tractor Co., General Offices, Peoria, Illinois, U.S.A.
CATERPILLAR
Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.
BEST USED EQUIPMENT BUYS ANYWHERE

NOTES from the Manufacturers

Bucyrus-Erie Co., South Milwaukee, Wis., has announced an expansion of territory for one of its crane-excavator distributors, Contractors Supply of Kansas City and Springfield, Mo. The expansion covers an additional 22 counties in northwestern Missouri and the county of Doniphan in Kansas. The distributor has plants at 620 E. 18th St., Kansas City, and 2675 College Street Rd., Springfield.

Electric Steel Foundry Co., Portland, Ore., has appointed Lawrence Gillen as sales manager for ESCO foundry products. Henry Ellas will continue as sales manager of mill products. Gillen has been field engineer for the Portland sales district. He will supervise the sale of ESCO earthmoving equipment, replaceable parts for construction equipment, and other products. Ellas will supervise the sales program of the stainless steel and plastic materials and products which ESCO distributes.

Hercules Powder Co., Wilmington, Del., has appointed Dale C. Johnson special sales representative for the construction industry in eleven western states. Johnson joined Hercules in 1952 and was assigned to the San Francisco district as a sales-serviceman.

Parsons Co., Newton, Iowa, has named the Associated Supply Co., 1034 Humble Dr., El Paso, Tex., as a distributor. The firm will sell and service the complete Parson's line of ladder and wheel-type trenchers. Territory assigned to Associated Supply includes nine counties in western Texas, and the counties of Otero and Dona Ana in southern New Mexico. Parsons is a division of the Koehring Co., Milwaukee, Wis.

TO ADVERTISE: All advertising in this section is payable in advance. Rate $1.00 per line, or $12.00 per inch of 12 lines. Minimum charge $4.00. No discounts; no commissions. Please count your copy carefully to avoid delay. Each line contains 41 characters. Count spaces and punctuation as one character each. Be sure to enclose the correct amount of money with your order. Rates and conditions subject to change without notice. Closing date—10th of preceding month. Example: January closes December 10th.

TO INQUIRE: Be sure to address your inquiry to the advertiser by using the listed address. If box number is used, mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

LARGE SHOVELS, CRANES, DRAGLINES — 3 YDS. & UP

HEAVY EXCAVATION EQUIPMENT
DRAGLINES, SHOVELS, CRANES, DRILLS, TRUCKS

15-W B-E elec. drag, 215', 12-yd.
450-W B-E diesel drag, 165' w/extra 10, 12, 13 & 14-yd. buckets.
9-W B-E elec. drag, 165', 10-yd.
9-W B-E diesel drag, 165', 12-yd.
7-W B-E diesel drag, 140', 7-yd.
7400 Marion diesel drag, 175', 13-yd.
7400 Marion elec. drag, 175', 12-yd.
1855 P&H diesel drag, 130', 10-yd.
625 Page diesel drag, 160', 9-yd.
621-S Page diesel drag, 125', 7-yd.
71-B B-E Crane w/160' boom.
200-W B-E diesel drag, 125', 6-yd.
2400 Lima elec. drag, 130', 6-yd.
2400 Lima diesel drag, 130', 6-yd.
4500 Manitowoc drag, 120', 5-yd.
120-B B-E elec. drag, 115', 5-yd.
71-B B-E elec. drag with 160' boom.
3900, 3500, & 3000 Manitowoc cranes.
111-M Marion drag, 100', 4-yd.
1601 Lima 4-yd. shovel/drag.
1055 P&H drag, 80', 4-yd.
1201 Lima dragline, 85', 3-yd.
54-B B-E drag, 80', 2½-yd.
5560 Marion 26-yd. elec. shovel.
190-B B-E 8-yd. elec. shovel.
151-M Marion 7-yd. elec. shovel.
1600 P&H 6-yd. elec. shovels.
170-B B-E 6½-yd. elec. shovel.
4161 Marion 6-yd. elec. shovel.
2400 Lima 6 yd. Std. & H.L. shovels.
120-B B-E 4-yd. elec. shovel.
1055 P&H 3-yd. H.L. shovel.
111-M Marion 4-yd. standard & H.L. shovels.
1201 Lima & 54-B B-E standard shovels.
#6 Northwest 1¼-yd. standard shovel.
Model T-650 Reich drill truck mtd. rotary and down-the-hole.
Ingersoll-Rand truck mtd. & crawler mtd. Drillmasters.
Keystone #50 truck and mtd. Stardrill.
Euclid trucks, rear & bottom dump; dozers, etc.

FRANK SWABB EQUIPMENT CO., INC.
313 Hazleton Nat'l Bank Bldg.
Hazleton, Pa.
GLadstone 5-3638

EUCLIDS
Rear, Bottom and Scrapers

12-yd. Bucyrus-Erie dragline.
9-yd. Bucyrus-Erie dragline.
6½-yd. Bucyrus-Erie shovel.
4-yd. Bucyrus-Erie shovel.
4-yd. Bucyrus-Erie dragline.
3-yd. Bucyrus-Erie shovel.
2½-yd. Bucyrus-Erie shovel and dragline.
1½-yd. Bucyrus-Erie shovel.
5-yd. Manitowoc dragline.
6-yd. Lima dragline and shovels.
Large stripping shovels.
Other equipment available, not listed above.

WILLIAM LUBRECHT, III
Construction Equipment
311 W. Diamond Ave. Hazleton, Pa.
Phone: GLadstone 5-4041 or 5-0523

LARGE SHOVELS, CRANES, DRAGLINES — 3 YDS. & UP

Marion 151M #8850
Marion 482 #6353
Marion 492 #7494
Marion 4161 #8197
Bucyrus-Erie 54-B Diesel #95643
Bucyrus-Erie 54-B Diesel #103533
Bucyrus-Erie 120-B #62821
Bucyrus-Erie 120-B #15220
All equipment subject to prior sale.
Contact:

PICKANDS MATHER & CO.
Purchasing Department
700 Sellwood Building
Duluth 2, Minn.

P & H model 1600 6-yd. electric shovel—excellent condition. Located in Mahanoy City, Pa. Owned by Gasparini Ex. Co., Inc., Peckville, Pa. Priced @ $125,000.

CLEVELAND BROTHERS EQUIPMENT CO.
Route 309 Phone VAlley 2-8141
Wilkes-Barre, Pa.

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

LIMA 2400 DRAGLINE
Immediate Delivery

120 ft. boom, Cat D397 engine with torque converter, 25 ft. crawlers with 63 in. pads. New 1956. Good condition, ready to go. Located Cal-Sag canal near Chicago. Rail or water shipment.

AL. FISHEL CO.
1318 N. Vandeventer Ave. St. Louis, Mo.
JE 5-4482

1—Northwest shovel 1½-yd. model 6, serial No. 15611 powered by Murphy Diesel model 20.
1—Northwest ¾-yd. dragshovel model 25, serial No. 25-12277 powered by Cat diesel.
1—Bucyrus-Erie model 10-B with 30' boom. Also available with hoe, ⅝-yd.
1—Bucyrus-Erie 15-B ½-yd. hoe powered by Buda gas engine.
1—Bucyrus-Erie 22-B with 45-ft. crane boom, serial No. 54390. Powered by Cat diesel.
1—Link-Belt shovel model K-570, 2¼-yd. powered by Cat diesel model 17000.
1—Lorain model TL-25K clamshell-dragline combination, powered by 3-cyl. G.M. engine with 70' boom, fairleads, Rudomatic tagline, wide shoes, long cats. Extra clean. Backhoe ¾-yd. available for this machine.
1—P & H model 255—45' boom with fairlead and ¾-yd. drag bucket, 19" tractor-type treads, Waukesha gas engine.
1—Insley ½-yd. hoe model K, powered by Buda gas engine.
1—Link-Belt shovel front for model LS-40, ½-yd.
3—Euclid model S-12 motor scrapers. Had very little use. Excellent condition.
1—Gardner-Denver model FYFXDE 7½x10" serial No. 131046 duplex pump, excellent condition $2,500

BEMISS EQUIPMENT CORP.
2219 Chamberlayne Ave.
Richmond 22, Va.
Phone ELgin 9-5766

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

Lima model 34 crawler-mounted clam-digging-hoe combination, Buda gas engine, 35' boom, dragline fairlead, tagline reel, hoe boom with dipper. Priced to sell. Will sell with one or both attachments.
Unit model 357 rubber-tired wagon crane, equipped with new Chrysler Industrial engine, 25' boom, tagline reel, overhauled machinery, repainted, excellent condition.
Lorain model 55 crawler-mounted shovel, equipped with UD-18 I.H.C. diesel engine. 25-ft. boom, tagline reel, overhauled machinery, operating condition.
Bay City model 45 crawler-mounted dragline-clamshell machine, equipped with Cat D4600 diesel engine, long crawlers, 45' boom, tagline reel, dragline fairlead.
Gradall model 2460. New in 1957, equipped with G.M.C. Series 3031C diesel engine on upper works. Mounted on Duplex 6 x 4 truck carrier. Included are 24" and 36" digging buckets and frost ripper. Machine in excellent condition and priced to sell at $18,000 our yard. No trades on this special.
Bucyrus-Erie model 22-B crawler-mounted hoe. Powered with Cat D318 diesel engine, long frames and wide treads. Cambered type hoe boom, ¾-yd. hoe dipper. Machine new in late 1955. Excellent condition.
Bucyrus-Erie model 22-B crawler-mounted hoe or crane. Powered with Cat D318 diesel engine, long cats, 30" crawler treads. Machine new in late 1955. Excellent condition.
Bucyrus-Erie model 11-B demonstrator 10-ton Transit Crane, equipped with up to 70' of boom. Six wheel drive carrier. Hoe equipment also available. Like new condition.
Northwest model 80-D shovel. Good working condition. Call or write for more details.
Lorain model 80-J crawler-mounted crane. Write for more details.

HYDROCRANES

Model H-2 Bucyrus-Erie Hydrocrane mounted on a Chevrolet truck chassis, equipped with 2-piece boom, rear outriggers, reel and bucket available. Priced to sell at $2,500 at our yard.
Model H-3 Hydrocrane, 1953, mounted on G.M.C. truck chassis. 2-piece telescopic boom, tandem outriggers, operator's cab, tagline reel, hose, ⅝-yd. Hydrocrane clamshell bucket. Recently overhauled. Very good condition.
Model H-3 Bucyrus-Erie self-powered Hydrocrane, 1955, mounted on Army surplus six-wheel drive carrier powered with G.M.C. engine. 2-piece telescopic boom, operator's cab, tandem outriggers, tagline reel with hose. ⅝-yd. clamshell bucket. Ford 4-cylinder Industrial engine on Hydrocrane upper works. Very good condition.
Model H-3 Hydrocrane, 1952, mounted on Ford truck chassis, equipped with 2-piece telescopic boom, operator's cab, tagline reel, ⅝-yd. clamshell bucket. Very good condition.
Model H-3 self-powered Hydrocrane, 1957, equipped with 2-piece telescopic boom, tandem outriggers, operator's cab with heater, reel and new style ¾-yd. twin-ram clamshell bucket, mounted on I.H.C. S-172 truck chassis. Complete machine in like new condition at a reduced price.

J. P. WAITE, INC.
2304 W. Pierce St. Milwaukee, Wis.
EV. 4-1900

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

EVCAVATORS

Byers Model 83-CC crane, mounted on Hendrickson crane carrier 80' of boom with jib, outrigger. Clean, serviceable machine. Located at Phoenix, Ariz. Priced to sell quickly.

Bucyrus-Erie 10-B, upperworks mounted on Crane Carrier Corp. chassis. Equipped with hoe attachment and 20' channel type dragline boom. No outriggers. Clean, ready to go to work. A bargain price.

Michigan model TM-16 mounted on Brederman chassis, cutaway cab, outriggers, 30' boom. Serviceable as is. Located at Casper, Wyo.

Lima model 34, powered by Caterpillar D318 engine. Dragline, backhoe, or both. Serviceable. Priced right, as is.

Link Belt LS-71 dragline, 45' boom with UD-14A International power. Clean, ready to go to work.

Bucyrus-Erie model 120-B boom. Standard 90' Complete. Excellent condition.

Koehring model 304.3-71 GM engine, shovel front, Esco bucket. A clean, serviceable machine. Ready to go to work. Located at Casper, Wyo.

TRUCKS AND SCRAPERS

6—Koehring WD-60 Dumptors GM diesel engines; 18:00 x 24 drive tires; 10:00 x 20 steering tires. Good condition. Ready to go to work.

2—Euclid model 23 TDT bottom dumps, 6-110 GM power, Torqmatic transmissions. New in 1957. Clean, good rubber. Located at Los Angeles, Calif.

2—Euclid model 91 FD rear dumps. New in 1958. Clean throughout. Good buys. Located at Los Angeles, Calif.

1—Euclid model S-12, 6-71 GM power, standard differential. A clean late model machine. Located at Casper, Wyo.

1—Allis-Chalmers TS-200, 6-cylinder Buda engine, Fuller transmission. Good rubber. Priced right. Located at Casper, Wyo.

TRACTORS

1—Allis-Chalmers HD-19, GM 6-71 power, front and rear push plates. Tractor is in good condition. Track system 75%. Lots of economical service as is. Priced to sell. Located at Casper, Wyo.

1—Caterpillar D8 14A Series. 8S dozer model 30 cable control unit, Ateco ripper with two shanks.

MOTOR GRADERS

2—Allis-Chalmers model AD-3 motor graders, cabs, lights. Good rubber. Located at Casper, Wyo.

1—Caterpillar model 12 9K Series, bare machine, 9:00 x 24 front tires; 13:00 x 24 rear tires. Fair to good.

THE COLORADO BUILDERS' SUPPLY CO.
1534 Blake Street **Denver 2, Colo.**

Lorain TL-20 combination crane and shovel with Cat D311 diesel engine. Ser. #18085. Price F.O.B. Asheville, N. C. $4,000

Lorain TL-25S shovel with Cat D315 diesel engine. Serial #25164.
Price f.o.b. Charlotte, N. C. $8,000

Allis-Chalmers TS-360 motor scraper. Serial #1315.
Price F.O.B. Greensboro, N. C. $19,500

E. F. CRAVEN CO.
P. O. Box 3307 **515 S. Eugene St.**
Greensboro, N. C.

1—B-E 22-B heavy-duty crane-dragline, sn 118207
1—B-E 22-B heavy-duty crane-dragline, sn 113866
1—Cat D7 angle dozer, sn 17A-13977
1—Cat D6 angle dozer, sn 17A-3684
1—Cat 212 motor grader
1—Allis-Chalmers scraper S-10 cu. yds.
1—Brownhoist Ind. hammer, double acting
1—McKiernan-Terry hammer model 3-C, double acting
1—2,200-lb. drop hammer & headblock
4—F600 1958 dump trucks
1—1956 T800 tractor
1—30-ton Dorsey trailer w/outriggers
4 pickup trucks

All equipment in excellent condition.

JAMES CHANCE CONTRACTOR
P. O. Box 1674 **New Bern, N. C.**
Phone ME 7-4294 or ME 7-6730

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

TRACTORS

Caterpillar D9 tractor, 19A Series, completely rebuilt, excellent operating condition. $29,500

Late models 13A and 14A Series tractors with dozers and rear mounted cable controls. .....$8,000 and up

3T Series D7 tractors .....$15,000 and up

3U Series D6 tractors .....$ 2,250 and up

MOTOR GRADERS

Allis-Chalmers AD-45 patrols, 13:00 x 24 tires on all wheels, cab, cab heater, lights, scarifier, 14-ft. mold boards, excellent operating condition, used 40 months since new, completely checked over, repairs made as necessary $6,500

SHOVELS

Bucyrus-Erie 51-B shovel, serial No. 98049, with Buda 6DC1742 engine. Price on application.

Bucyrus-Erie 38-B combination shovel-dragline, serial No. 108729, with Caterpillar diesel engine. Price on application.

Northwest ¾-yd. shovel front, good condition $500

Bucyrus-Erie 22-B with 50-ft. crane boom, extra counter-weight, tag master tagline, powered with Caterpillar D318 diesel engine, mounted on a self-propelled Maxi carrier, with 8 14:00 x 20 tires. This machine is in excellent condition, completely remanufactured. Price on application.

P & H ¾-yd. shovel, serial No. 10758, with 55' crane boom, extra counterweight, tractor-type tracks, 20" flat grousers. This machine is in good running condition ..$5,750

2—40' crane booms for 22-B machines, used very little. Price on application.

MISCELLANEOUS EQUIPMENT

Pioneer 54 x 24 roll crusher, portable, tandem axle, 11:00 x 20 tires, with 4 x 12 Cedarapids vibrator screen with 20 horsepower electric engine. Price on application.

Pioneer apron-feeder, 6' x 30" type A, 2-chain, with flared sideboards. Is like new and in good condition. Used only about 90 days. Price on application.

Pioneer 3' x 10' two deck, 4-bearing vibrator screen, equipped with 2" square opening top deck ½" wire; ¼" square opening #9 wire bottom deck, motor mount, extra set of screens. Not used over 3 or 4 months. Price on application.

Galion 10-ton 3-wheel steel roller, powered with Buda gas engine. Machine completely remanufactured, excellent operating condition. Price on application.

Barber-Greene travel mixer. Price on application.

Barber-Greene pug-mixer. Price on application.

We also have a large stock of miscellaneous logging equipment, such as jammers, towing winches, and skidding tractors. Many of these units are too numerous to list here. Please inquire as to any specific need of this type of equipment.

WESTMONT TRACTOR CO.
Box 1445 **150 E. Spruce St.**
Missoula, Mont.

1—Link-Belt model LS-80 crane with 50' boom, Rudomatic tagline, Buda gas, s/n 7074.
1—Link-Belt model LS-60 hoe, Buda gas engine, s/n 8128.
1—Bucyrus-Erie 10-B gasoline powered dragline, standard cats, excellent shape, s/n 20429.
1—Clark 10,000-lb. fork lift, solid tires.
1—Towmotor LT44 with pusher attachment on solid tires.
1—LeRoi 315 air compressor on 4 pneumatic tires, 7 or 8 years old.
1—Ruhr M-1—½-yd. heavy-duty grapple, new.
1—Wayne 36" rider industrial vacuum pick-up sweeper, demonstrator, 2 years old.
2—GMC Jetcretes with all accessories. Excellent condition, practically new with all extra accessories.
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S. M. CHRISTHILF & SON, INC.
Timonium Road and Harrisburg Expressway
Timonium, Md.

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

CONTRACTORS EQUIPMENT
For Sale or Rent

Allis-Chalmers HD21 tractor with rear double drum power control unit and dozer. A rebuilt machine, ready for any job.

Allis-Chalmers HD16 tractor with rear double drum power control unit and cable dozer. Completely reconditioned—ready to go.

2—Allis-Chalmers HD6G tractors with 1½-cu. yd. hydraulic loaders. Both of these machines have been rebuilt in our shop and carry 90 day guarantees.

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Allis-Chalmers model AD3 tandem drive motor grader. Unit is in very good condition, ready to go.

2—Caterpillar D4 tractors with 1-cu. yd. hydraulic loaders. All necessary repairs have been made and these machines are in very good condition.

2—International TD-14 tractors with hydraulic dozers. Here is an opportunity to buy a medium-sized dozer very reasonably.

Bucyrus-Erie model 22-B clamshell. Has 40' boom, GMC Diesel engine. This machine is in good condition.

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Northwest #25 truck crane, S/N 12454, 40' boom, telescoping boom stop, outriggers and floats. Dart carrier, 10 Michelin 11:00x20 tires, gas engine. Good op. cond. As insp. $16,500

CLAMSHELL

Lorain 820, 2-yd. crane and clamshell, 65' boom, pendant supension, 34" tracks, Rudomatic tagline, Cat D13000 diesel engine, S/N 18523. Rebuilt and guaranteed. $33,000

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Bucyrus-Erie 22-B S/N 69159, ¾-yd. hoe, 26" tracks, Buda gasoline engine. As inspected $12,000

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Bucyrus-Erie tunnel shovel attachment for 38-B, consisting of 15' boom, 12' handle, 1½-yd. dipper. Excellent cond. $4,500

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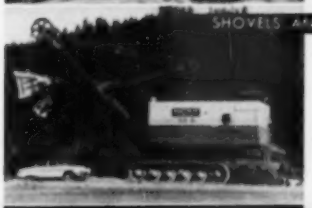

SHOVELS AND CRANES

2—Model 150B Bucyrus Erie 6 cu. yd. Electric Shovels and Draglines (Note: 8 cu. yd. Dippers w/handles available for above); 1—Model 120B Bucyrus Erie 5 cu. yd. Electric Shovel and Dragline; 1—Model 38B Bucyrus Erie 1½ cu. yd. Shovel, Dragline, Backhoe, diesel; 1—Model 22B Bucyrus Erie ¾ cu. yd. Shovel, Dragline, Backhoe, diesel.

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9—Model 12 Caterpillar Motor Patrols, 8T, 80D, 70, and 71D Series.

HAULING UNITS

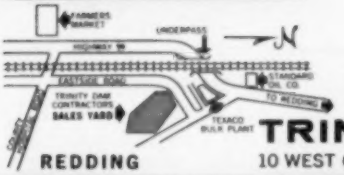
8—Model LRVX Mack Tractors w/Model 137W Euclid 30 cu. yd. Bottom Dump Trailers powered by NVH-12-B1 Cummins Engines; 10—Model PH95AC International Payhauler Tractors w/Model PW20 30 cu. yd. Athey Bottom Dump Trailers.

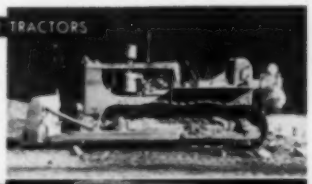
END DUMP EUCLIDS

5—Model 46TD Euclid End Dump Units, 15 cu. yd., powered by Model NHRBIS Cummins Engines; 10—Model 63TD Euclid End Dump Units, 15 cu. yd., powered by Model 6-110 GMC Engines.

LOADERS

1—Model 175ADS Michigan 3 cu. yd. loader powered by Model 135DKBS Waukesha Engine; 1—Model D4 Caterpillar Loader w/Model EA4 Trackson Loader.





CRAWLER TRACTORS

15—Model D9 Caterpillar Tractors w/P.C.U.'s and Dozers, 18A Series (Note: 4—Ateco Hydraulic Rippers available for above); 21—Model D8 Caterpillar Tractors w/P.C.U.'s and Dozers, 14A Series (Note: 6—Caterpillar #8 Hydraulic Rippers available for above).

RUBBER TIRED TRACTORS

30—Model DW20 Caterpillar Tractors w/Model 456P Modified Scrapers, 67C and 88E Series; 10—Model DW20 Caterpillar Tractors w/Model PW20 Athey Wagons, 88E Series; 2—Model 33LDT Euclid Tractors w/Model 32SH Scrapers.

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1—Model TWM2A Joy Quarry Drill w/T500 Drills, pneu. tires; 3—Model TWM-5 Joy Quarry Drills w/T500 Drills, pneu. tires.

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1—3400 gal. Model CF523C6 Kenworth powered by Model NRT6B1 Cummins Engine; 1—3400 gal. Model R1F402 International powered by Model NHB Cummins Engine; 1—3600 gal. Model RDF192A International powered by Model J8S600 Cummins Engine; 2—6000 gal. Model 46TD Euclid powered by Model NHRBIS Cummins Engine.

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5—4 yd. Dumpcretes mounted on International truck.

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SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

Bucyrus-Erie model 10-B dragline, serial No. 88595, with Buda gasoline engine, 28' crane boom. Good working condition $3,500

Bucyrus-Erie model 22-B combination clamshell & crane, serial No. 104362, with Caterpillar D318 diesel engine, 50' boom, counterweights. Being rebuilt in our shop.

Bucyrus-Erie model 38-B 1½-yd. shovel, serial No. 112162 with Caterpillar D13000 diesel engine, Kohler light plant, standard crawlers with 33" treads. Location—northern New Jersey.

Bucyrus-Erie model 51-B 2½-yd. shovel, serial No. 62581 with Caterpillar D17000 diesel engine, standard crawlers with 36" treads. Low hours. Reconditioned and in very good condition throughout.

Unit model 614 ½-yd. backhoe, serial No. 50062 with 2-71 G.M.C. diesel engine. Good condition throughout $7,850

Unit model 1020 backhoe, serial No. 49052. Good condition.

Bay City model 45 combination crane and backhoe, serial No. 6110 with Caterpillar D318 diesel engine. Good condition.

Byers model 83 heavy-duty lifting crane and dragline, serial #1885, Hercules gasoline engine, extended crawlers with 30-in. treads and additional counterweights. 40' boom. Excellent condition throughout, used only 968 hours. Outstanding value. $8,500

Lima model 802, year 1949, serial No. 5145. Caterpillar D17000 diesel engine, Kohler light plant, combination dragline and clamshell, 60' boom, extended crawlers, 36" treads. Recently completely rebuilt $39,750

Lima model 1201, year 1954, serial No. 329514. Cummins LI diesel engine, Kohler light plant, combination dragline, clamshell, 80' boom, high gantry, extended crawlers, 40" treads. Good condition $63,500

Bucyrus-Erie Hydrohoe attachment for H-3 Hydrocrane complete with 18" general purpose dipper, 20" utility dipper, 12" narrow dipper and all necessary fittings. Excellent condition. Complete $750

Bucyrus-Erie 22-B shovel front complete with dipper trip, chains and lagging. Good condition $1,500

Lorain ¾-yd. shovel front, Amsco bucket complete with dipper trip. Excellent condition throughout $1,500

Bay City 45 ¾-yd. shovel front complete with dipper trip. Good condition ...$1,500

BINDER MACHINERY CO.
Brighton St., Union, N. J.
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SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

Bucyrus-Erie mdl. 38-B, 1½-yd. dragline with long and wide track, 11'6" wide, 7'5" long, 33" pads, 70' boom pendant suspension unit, 79 extra counterweights. Powered by IHC UD 1091 diesel engine. Total weight 109,360#. Replacement cost $60,915. Like new condition. 4 months of rental service is all this dragline has been used.
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Bucyrus-Erie model 51-B 2-yd. capacity lifting crane with 100' boom and 20' jib. Long and wide under carriage, 40-ton sheave block. Powered by Buda model 6DCB diesel engine. Crane less than 2 years old, has been in our rental fleet, saw very little service, like new condition. Replacement cost approximately $82,000.
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Bucyrus-Erie model 38-B, 1½-cu. yd. shovel, powered by IH 1091 engine.
$32,000 F.O.B. Elizabethtown, Ky.

Bucyrus-Erie model 38-B, 1½-cu. yd. shovel, powered by GMC diesel engine with torque converter, 1957 model.
$40,000 F.O.B. Elizabethtown, Ky.

Bucyrus-Erie model 22-B heavy-duty dragline, clamshell, 60' boom pendant suspension, lifting crane. Long & wide tracks, extra counterweights. Powered by IHC UD-525 diesel engine. Replacement cost $34,499.60.
$22,000 F.O.B. Louisville, Ky.

Bucyrus-Erie model 22-B, ¾-yd. capacity basic machine. Powered by IHC model UD-525 diesel engine. Less than 3 years old. Excellent condition. From our rental fleet.
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Insley model ¾-yd. dragline with fairleads and 40' boom, powered by Caterpillar diesel engine.
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Lorain mdl. 820, 2-yd. shovel, powered by Caterpillar D13000 diesel engine.
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Lorain model 40, ¾-yd. shovel on crawlers. Powered by gasoline engine.
$4,500 F.O.B. Elizabethtown, Ky.

P&H model 255-A, ¾-yd. shovel, crawler mounted, powered by Caterpillar model 315 diesel engine.
$14,500 F.O.B. Elizabethtown, Ky.

Insley mdl. ¾-yd. backhoe attachment.
$1,200.00 F.O.B. Elizabethtown, Ky.

Lorain model TL-20 dragline with 45' boom. Waukesha gas engine. Undercarriage rebuilt. Good operating cond.
$7,000.00 F.O.B. Evansville, Ind.

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General model 307, ¾-yd. dragline with 45' boom and fairleads. Powered by IHC UD9 diesel engine, ½-yd. dragline bucket.
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Unit ½-yd. capacity shovel, powered by Chrysler Industrial gasoline engine.
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Bucyrus-Erie 51-B backhoe—unused.
Bucyrus-Erie 15-B center boom section, 15 feet long—unused.
Lima 34 swing-type fairlead—unused.

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FLEET—EARTH MOVING EQUIPMENT
3—Caterpillar tractors—2U Series
1—Caterpillar model 12 grader
2—Euclid S-18 motor scrapers
3—Euclid SS-18 motor scrapers
All in Excellent Condition

WILLIAM A. RUPERT CONTRACTOR CORP.
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Caterpillar D337 power unit, gas starting, with radiator, enclosed clutch. $1,600.
Murphy ME650 power unit, 200 h.p., radiator, steel skids, enclosed clutch, electric starting direct. $1,600.
Caterpillar D13000 power unit, with radiator, enclosed clutch. $1,250.
Caterpillar D13000 power unit, with radiator, clutch, outboard bearing, steel skids, built in fuel tank, $1,850.

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Dodge 1954 2-ton dump truck with two speed axle, good condition.
John Deere model 440 crawler tractor, rotary front end loader with grader blade, Mark three backhoe with 18", 30" and 36" bucket and Birmingham lowboy tandem trailer capacity 12,000#, model 46FSA, serial 509, new August 1958, good condition:

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New KT-8 4-6 ton Buffalo-Springfield tandem roller, serial #29765. Powered with Y112 Continental engine with torque converter. Including retractable towing attachment and brakes on wheels.
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All new—special prices on request.

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Used 22-ton Yuba Movall rock wagons—without tractors. Write with full details to:

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330,000 yards of rock removed

by this shovel rigged with USS Tiger Brand Wire Rope

In 15 ten-hour working days this 2½ yard shovel scooped out 30,000 cubic yards of hard sandstone, shale and clay on the rebuilding of Route 39 near Salineville, Ohio. It had just finished another job where it had excavated 300,000 yards of rock . . . with no appreciable downtime.

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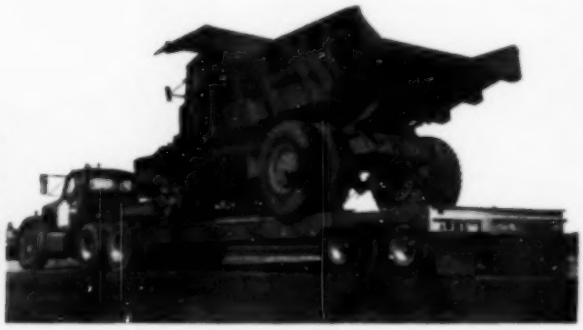
400,000 miles without failure on their first LaCrosse Trailer– Matson, Inc. owns 11 now

Matson, Inc. has traveled 400,000 miles with the above LaCrosse Lowbed, hauling such loads as this 25-ton scraper. Never a failure since the trailer was put in service in 1954.



This huge quarry truck was hauled from near Boston, Mass. to Iowa City, Ia. on a LaCrosse Lowbed. Annually, Matson's 11 LaCrosse trailers each average 80,000 miles.

Loren Baker, Superintendent
MATSON, INCORPORATED

Rarely does a trailer manufacturer have the opportunity to dramatize product quality—yet, the very factor that permits LaCrosse owners like Matson, Inc. to establish such outstanding performance records as the following—stems from such quality . . .

Loren Baker, superintendent of this Cedar Rapids hauling firm, says: "We bought our first LaCrosse lowbed trailer in 1954. It has seen over 400,000 miles service and we've never put a weld on it.

"We're racking up more than 800,000 miles per year on our *11* LaCrosse trailers, hauling power shovels, scrapers, tractors and rock crushing equipment into 39 states. Haven't had a failure on any yet.

"Besides, the gooseneck is low, so that a big scraper can be easily hauled in conformance with the 13' 6" clearance regulation in most states.

"Big tail lights, smooth hauling characteristics are other features we like."

Matson purchased 5 LaCrosse Trailers in 1959 . . . kind of like betting on the winning horse.

Facts like these show why LaCrosse Trailer sales zoomed 40% in 1959. Each is backed by a full one-year warranty in writing. Here's how to get complete information.

LaCROSSE

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